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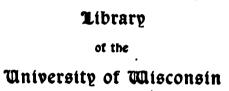
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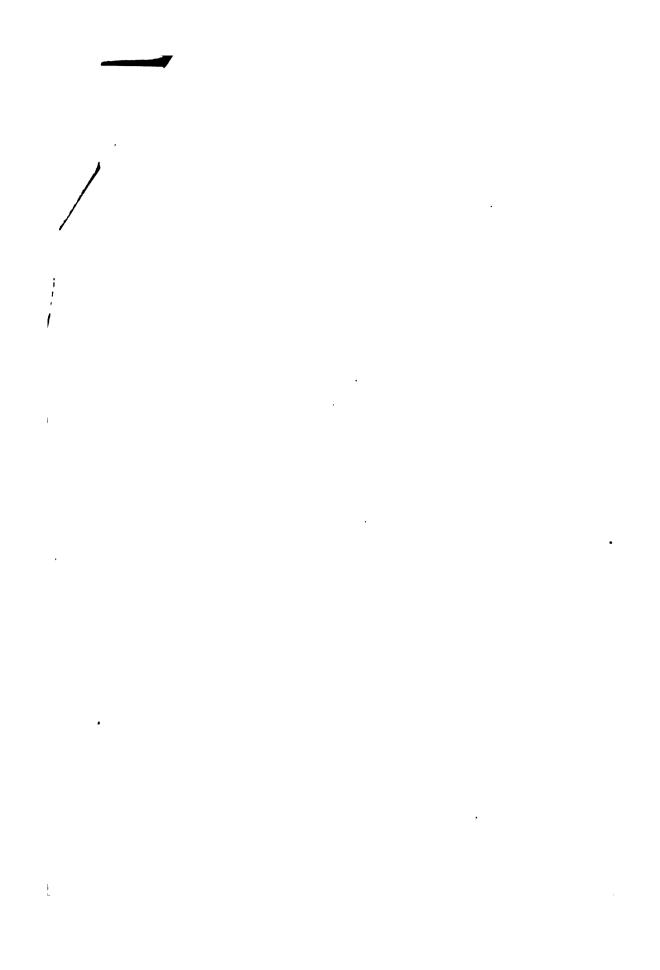
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AMERICAN MINE ACCOUNTING

METHODS AND FORMS
EMPLOYED BY LEADING MINING COMPANIES

 $\mathbf{B}\mathbf{Y}$

W. H. CHARLTON, P. A. Member Lake Superior Mining Institute

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PREFACE

While engaged as accountant with various copper-mining companies in the Lake Superior District, covering a period of twelve years, I was impressed with the fact that the subject of mine accounting was not being given the attention in technical literature that it might well receive, there being to my knowledge only three books published on the subject in the English language, one in this country, one in England and one in Scotland.

The result was that I set about the compilation of the material in this volume, which are the practical working systems of companies representative in their particular fields of mining, believing that this treatment of the subject would be more generally appreciated than a theoretical discussion.

I have included in the accounting system of the Ojibway Mining Co. methods for a mill, in order to round out the subject, although this company has not built a mill at the present time.

There will no doubt be found errors, both of omission and commission, although I have endeavored to avoid them as much as possible; however, I will be glad to correct in future editions any inaccuracies that are brought to my attention.

I wish to acknowledge the many courtesies of my friends who assisted in gathering together and preparing the material in this volume. I am particularly thankful to Mr. E. B. Wilson, editor of "Mines & Minerals," for the use of the articles: "Recording Engineering Data at the Calumet & Arizona Mine," "Recording Engineering Data at the Boston & Montana Con. Mine," and "Recording Geological Data at the Calumet & Arizona Mine"; also to Mr. E. E. Whiteley, Mr. Lee Hayes and Mr. Thorald F. Field, the respective authors of these articles. I am also indebted to Mr. L. E. Camomile, Manager of "Mines & Methods," for the use of the material in the chapter on the methods of the Utah Con. Mining Co., which originally appeared in that journal.

In conclusion I commend this volume to the kind consideration of mining men in general and mining accountants in particular, with the hope that it will be of material benefit to the mining industry of this country.

W. H. CHARLTON.

DETROIT, MICH. December, 1912.

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CHAPTER I

MINING IRON ORE

ACCOUNTING METHODS OF THE OLIVER IRON MINING COMPANY

In the Lake Superior District, iron ore is found distributed over a wide area of country. In the Michigan and Wisconsin ranges the ore is found in blanket formations, which are developed by both vertical and inclined shafts, drifts being run into the ore bodies at convenient levels. Stopes are opened into the ore body from the drifts at regular intervals. The ore is broken down in the stopes with machine drills; it is then loaded in cars, trammed to the shaft and hoisted to the shaft house, crushed and either loaded direct into railroad cars for shipment or placed on the stockpile, to await the opening of navigation. From the mines the ore is shipped in railroad cars to the ore docks located at convenient lake ports. From there it is forwarded to Lake Erie ports in steamships.

On the Minnesota ranges the ore is found in blanket formation near the surface of the earth. A great many of these mines are worked as open pits. The surface formation is stripped off the ore by steam shovels. Railroad tracks are laid directly onto the ore body, the ore is broken with dynamite and loaded directly into the railroad cars with steam shovels; it then goes to the ore docks at the nearest lake port, where it is loaded into vessels for shipment to lower lake ports. From the lower lake ports the ore finds its way to furnaces in the Pittsburg District, where it is reduced to commercial iron and steel.

The Oliver Iron Mining Company and its subsidiary companies operate the following mines on the different ranges:

Range	District	Mines
[arquette	Marquette	Section 21. Section 16. Queen. Hartford. Hard Ore. Hematite. Moore. Stegmiller. Winthrop. Champion.

Range	District	Mines
	Iron Mountain	Chapin. Aragon. Cundy. Iron Ridge. Pewabic.
Menominee	Crystal Falls	Michigan. Mansfield. Riverton. Hilltop. Cuff.
Gogebic	. Ironwood	Aurora. Atlantic. Chicago. Davis. Norrie. Puritan. Tilden.
Vermilion	Ely	Chandler. Pioneer. Savoy. Sibley. Soudan. Zenith.
vermillon	Mountain Iron	Mountain Iron Stephens. Virginia. Sauntry. Higgins. Union.
Mesabi	Eveleth	Adams. Spruce. Auburn. Fayal. Geneo. Duluth. Biwabik. Gilbert. McKinley.

Range	District	Mines
esabi	Hibbing	Burt. Clark. Chisholm. Hull. Pillsbury. Rust. Sellers. Glen. Day. St. Clair. Penobscot. Hull-Rust. Leonard. Mahoning. Hartley. Sharon. Tener. Monroe. Winfield. Morris. Meyers. Donora.
	Colraine	Canisteo. Holman. Walker. Hill.

GENERAL LEDGER ACCOUNTING

Mine, General Account.—Representing Inventories of Supplies and Ores, and to balance with Sub-ledger accounts of——mine after all entries for the month are made. To receive all charges pertaining to blank mine, as well as profits on sales and to be credited with all sales and transfers to other accounts.

Company, General Account.—To be credited with Inventories, Accounts Receivable, Cash if any, and other investments made by proprietor company with operating company. This account to have no additional entries made therein except to increase or decrease the amount of such investments and to represent the working capital or investment provided the operating company.

Company, Operating Account.—To represent the operations of mines owned by blank company. To be credited with all profits each month or charged with losses as well as amount expended for New

THE COST OF IRON ORE AT THE FURNACE

	Profit and Loss		Profit on Sales	Ore at Lower Lake Ports	Freight
Administrative Salaries Printing and Stationery	Earnings	Operating Expense New Construction	Marine Insurance	Ore at Upper Lake Ports	Lake Freight
Postage Office Furniture and Fixtures Office Expense Telephone and Telegraph Legal Expense Rentals Traveling and Entertainment Advertising	Fixtures graph rtainment		Royalty	Ore at the Mines	Freight
nissions Special Expense Analysis Prospecting Experimental Work			Improvements Insurance Taxes Depreciation District Expense Office Loss and Gain	Surface Expense Hoisting Stocking and Sorting Ore Shipping Ore from Pockets Loading Stockpile, Steamshovel Loading Stockpile, Hand Stripping R. R. Tracks Breaking and Crushing Ore Surveying and Chemistry Office Expense Contributions Personal Injuries	Mining Expense Development in Rock Development in Ore Besping Trambering Picking and Storing Rock Tramming by hand Tramming by power Cage and Skip tenders re Pumping U. G. Tracks Mining Captains Shift Bosses and Time- keeper Dry and Change Houses
Norz.—This chart ret Debit accounts are in i subaccounts or direct cha	represents the cost from italies, items appearing the geometric charges to the account.	represents the cost from underground mines. In italics, items appearing below them are either charges to the account.		General Surface Misc. Grading Highways	Mine Exploration General U. G. Expense Rock Filling Steam Shovel

Construction, Plant, etc., and at close of each month to represent liability of operating company to proprietor of mines operated, in addition to liability of General Account.

____Mine, Profit and Loss.—To represent profits or losses of blank mine for the month and balance transferred each month to operating accounts. This account carried on books to show earnings of each mine by itself and for quick reference.

Note. ——Mine, General Account

——Mine, Profit and Loss

Above accounts to be carried for each mine operated.

——Company, General Account

——Company, Operating Account

Above accounts to be carried for each proprietor company.

SUB-LEDGER ACCOUNTING

Mining Supplies	Inventories. To be represented by and balanced against ————— Mine, General Account, general ledger.
Mining Labor	To represent cost of and be closed off to "Ore at Mines."
Royalty	To be closed off to "Ore at Upper Ports" crediting fee owners royalty, sub-ledger, and Royalty account general ledger.
Rail Freight	To be closed off to "Ore at Lower Ports."
Taxes	Administrative expenses, to be closed off to mine, Profit and Loss account, and shown on cost sheet as memo. only.
New Construction	To be closed off to General New Construction or operating account of operated mine.
Misc. Income	Represent Rentals, etc., to be closed off to General Ledger accounts or operating account of operated mine.
Winter Expense	Deferred charges. To be closed into district accounts and from them to general accounts, and taken up into costs as provided for.

Accounts Receivable.—It being necessary to a greater or less extent to sell supplies and personal labor, or perform shop labor for outside interests, which is chargeable to accounts receivable, on the General Books, and these charges originating from supplies, labor and profits on same, it is desirable that these come to the General Office from one source only. Therefore the mines will transfer their labor and shop profits to supplies each month and make all charges for Accounts Receivable on (form 115) showing such charges in detail as to the names and amounts. This charge will then correspond in amount with the invoice rendered. The smaller items will be charged to mine or District Accounts Receivable and the larger direct to the party invoiced. Any profit there may be either in supplies or labor will require a journal voucher. charging Supplies and crediting Mine Profit and Loss. This means that including operating and other mine supplies the above will cover all disbursements of supplies of whatsoever nature from the warehouse during the month, except as per form 113.

GENERAL COST SHEET

Mining Labor.....

Mining Supplies.....

General Repairs.....

Direct Expense Mine....

TOTAL MINE COST SHEET

Direct Expense, General Office Misc. Profit and Loss Insurance Depreciation

TOTAL COST "ORE AT MINES"

Royalty

TOTAL COST "ORE AT UPPER PORTS"

Rail Freight Lake Freight Marine Insurance

TOTAL COST "ORE AT LOWER PORTS"

GENERAL OFFICE AND MINE ACCOUNTING

MINE ACCOUNTS—EXPENSE ACCOUNTS

Whenever any of the charges which fall against the expense account noted below pertain to the respective mines of the companies direct, they will be known as *Direct Expense Mine* or *Direct Expense General Office*, according to where the charge originates. When pertaining to

the district or collection of mines in one district, they will be known as District Expense. When pertaining to one company, as General Expense, and to the mining companies as a whole, To Company General Expense, as follows:

Company General Expense.—Expenses pertaining to the companies as a whole, when all mines are equally benefited, such as General Office Rents, Salaries, etc., and will be pro-rated to General Expense of the various companies each month on a basis to be determined according to tonnage produced by each, or such other basis as may seem equitable.

General Expense.—Expenses pertaining to one company direct, such as Salaries, Rents, etc., for the benefit of one company to the exclusion of all others as well as proportion of Company General Expense, will be treated as Administrative Expense and charged to Profit and Loss, but will, however, be carried as a memo. on the General Office Cost Sheet (pro-rated on a tonnage basis) to show the cost per ton of General Expense, such charge to Profit and Loss being carried through the same accounts in the general office into the Mine Profit and Loss until the end of the year except on mines under operating contracts, when it will be charged each month from Mine Profit and Loss into Operating Account.

District Expense.—Expenses pertaining to a district such as General Superintendent and Clerks salaries, stationery, telegrams, etc., which are paid for the benefit of the district or collection of mines as a whole, such expense to be pro-rated on a tonnage basis and charged to Direct Expense Mine, or General Office, as the case may be according to where the charge originates.

Direct Mine Expense.—Expenses pertaining to a mine direct, such as Superintendent's salary, Rents, etc., paid for the benefit of such mine exclusively, as well as its proportion of District Expense. Direct Expense will be treated as an operating cost and shown on mine cost sheet as "Office Expense." It will be transferred to the General Office on journal voucher of Labor and Supplies (forms 115-6) as part of operating expense and shown on General Office Cost Sheet as Direct Expense Mine.

Direct Expense General Office.—Covering expenditures of same nature as Direct Expense Mine, except that they originate in the General Office and will be treated in same manner except as shown on General Office Cost Sheet as "Direct Expense General Office."

Note.—It is desirable to charge expenses as nearly direct as possible, and all expenses should be charged (if applying to one mine directly) to that mine in preference to putting it through the District expense, Direct Expense and General Expense only being used where the expenditures are of a general nature, applying to more than one mine or company.

- 1. Salaries.—Superintendents and Managers, Officers and Clerks, except telephone and telegraph departments, time-keepers and store-keepers.
- 2. Printing and Stationery.—Purchased direct or charged from stationery department, including all office supplies, rubber stamps, transfer files, etc., stamped envelopes, and printed postcards (except cost of stamps thereon) which should be charged to No. 3.
 - 3. Postage.—Includes postal cards and stamps on stamped envelopes.

4. Office Furniture and Fixtures.

- A. Furniture, including Desks, Tables, Chairs, Book Cases, filing cabinets, etc.,
- B. Apparatus, including typewriters, calculating machines, check punches, etc.,
- C. Fixtures, including movable partitions, shelving, window shades, etc.,
- D. Repairs, labor and material.
- 5. Office Expense.—A. Petty office expense, including heat, light, water, ice, janitor, messenger service, etc.,
 - B. Directors' fees, and corporate expenses,
 - C. Hotel expenses and lunches, excluding those chargeable to No. 9,
 - D. Maps, guides, subscriptions, etc.,
 - E. Moving, changing and repairing office building and partitions, painting, etc.,
 - F. Payments to banks for handling pay checks.

6. Telephone and Telegraph.

- A. Telephone rentals,
- B. Telegraph rentals,
- C. Telegraphers.
- D. Salaries of operators.
- E. Toll service.

7. Legal Expense.

- A. All court expenses, attorney's fees, etc. (except salaries of regularly employed counsel, chargeable to account No. 1,
- B. Registration of deeds, leases, etc.

NOTE.—Above not to include any legal expenses pertaining to personal injury cases; this will be charged to operating.

8. Rentals.

- A. Offices.
- B. Warehouses,
- C. Real estate, including minimum rental of ore properties when same does not apply on future royalty.

- 9. Traveling and Entertainment.—Includes moving expenses of employees.
 - 10. Advertising.
 - 11. Outside Agencies and Commissions.
 - A. Expenses, Cleveland Office,
 - B. Expenses, Pittsburg Office,
 - C. Commissions on sale of ore.
 - 12. Special Expenses.
 - A. Detective service,
 - B. Private cars, expense of officers,
 - C. Premium on surety bonds,
 - D. Special expense not otherwise provided for,
 - E. Donations of the general office.
- 13. Analysis.—Including the cargo analysis at lower lake ports by independent chemists, analysis at upper lake ports to be pro-rated against mines for which analysis are made.
- 14. Prospecting.—Examination of properties, analysis, etc. (except laboratory expenses), not to include regular mine prospecting, but applying more directly to new properties.
- 15. Experimental Work.—Including draughting, laboratory and other work of an experimental nature, outside of regular mine practice (Labor and Supplies).

NOTE.—Form 127 has been provided for the purpose of classifying the expense accounts and should be made up promptly and sent to the General Office for the statical department. This form should be made by the parties handling the accounts as follows:

- "Company General Expense" for the full amount of such expense.
- "General Expense," all except proportion of "Company General Expense."
 - "Direct Expense Mine," all except proportion of "District Expense."
- "Direct Expense General Office," all except proportion of "General" and "District Expense." The total of the reports making the total expense of the companies as a whole. The form should be checked carefully to see that it agrees for both month and season with the cost sheet, and with forms 115-6 for the month.

NEW CONSTRUCTION ACCOUNTS

To this account will be charged the cost of buildings, structures or additions to the company plant, such as new offices, machine shops, blacksmith's shop, power plant, pumping plant, engine houses, shaft house, etc., including all additions to the plant which will increase the value of such plant, and are entirely new.

A separate account will be kept with each item of New Construction.

Nothing to be charged to New Construction account excepting expenditures, which per instructions from the proper authorities, are eventually to be charged to plant account.

As soon as any expenditure to New Construction is authorized the general accounting department is to be notified by a statement detailing the nature of the expenditure and the estimated cost.

The accounting department will give such construction a number and all future correspondence and accounting will refer to it by that number. As soon as such construction is completed and all bills in connection therewith are in, the general office must be notified of its completion.

The mine office will carry such construction on their ledger and make all charges in connection thereto, but such charges are to be no part of operating expenses and will be transferred to the General Office on journal voucher from the pay-roll and stores distribution.

The General Office will carry an account with each New Construction by description and number taking up the charges monthly from the mine vouchers and transferring at completion to New Construction. Upon the completion of such construction the General Office must be furnished with a detailed analysis of same, showing the principal details going into it, at the end of the year transferring all mine New Construction to Plant Account.

Monthly analysis of the account must be furnished the General Office on form 202, Fig. 16.

All charges both labor and supplies against the construction accounts must be made in accordance with the following schedule in order that a proper and comparative cost may be obtained for like buildings or plants.

A. Buildings

- A. Excavation
- B. Grading and filling
- C. Foundation
- D. Superstructure complete except
- E. Brick veneering
- F. Metal sheathing
- G. Lavatories, bath-rooms, light and heating plant
- H. Furnaces, sidewalks, out-buildings, painting, etc.
- I. Misc.

B. Boiler Plants

- A. Excavation
- B. Filling and grading
- C. Foundations
- D. Boilers and breeching
- . E. Installation including setting and fittings for boiler

- F. Steam pipe, all steam pipe, valves and fittings in boiler house, and all main steam lines and flanges, separators and traps, connections to surface plant
- G. Water system, all feed water heaters, feed pumps, pipe, valves, fittings, coverings, hangers and supports.
- H. Purifiers, piping and connections
- Economizers, installation complete, including flues, dampers, pipe connectors, etc.
- J. Coal hoists complete, including cages and cars
- K. Chimney foundations
- L. Chimneys
- M. Excavation for chimney foundations
- N. Misc.

C. Pumping Plants

- A. Excavation
- B. Grading and filling
- C. Foundations
- D. Pumps
- E. Condensers
- F. Pumping engines
- G. Installation
- H. Steam piping and air lines, including covering and hangers
- I. Water columns, including suction pipe and hangers
- J. Misc.

D. Hoisting Plant

- A. Excavation
- B. Grading and filling
- C. Foundations for engine
- D. Engines
- E. Installation
- F. Piping and connections
- G. Hoisting ropes, sheaves, idler stands, etc.
- H. Cages and skips
- I. Misc.

E. Compressor Plant

- A. Excavation
- B. Grading and filling
- C. Foundations
- D. Compressors
- E. Intercoolers and receivers
- F. Installation
- G. Piping and connections
- H. Steam lines
- I. Air lines
- J. Misc.

F. Shops

- A. Foundations for machinery
- B. Shafting, pulleys and belting
- C. Machine tools each shop
- D. Instal machine tools
- E. Piping and connections
- F. Misc.

G. Shaft Houses

- A. Excavation
- B. Foundations
- C. Shaft houses
- D. Head frame, with timber pocket
- E. Grizzlies
- F. Misc.

H. Trestles

- A. Grading
- B. Coal trestles
- C. Stockpile trestles
- D. Railroad trestles
- E. Piling

I. Equipment

- A. Locomotives, electric and steam
- B. Cars, surface or underground
- C. Steam shovels
- D. Cranes
- E. Misc.

J. Electric Light and Haulage Plant

- A. Motive power
- B. Generator
- C. Switchboard
- D. Installation

 E. Material for line circuit
- F. Installation for line circuit
- G. Piping
- H. Storage batteries
- I. Excavating
- J. Grading and filling
- K. Foundations
- L. Misc.

K. Pipe Lines

- A. Excavation
- B. Pipe and fitts
- C. Covers
- D. Installation
- E. Concrete foundations
- F. Misc.

L. Railroad Tracks

- A. Grading
- B. Rails and fastenings
- C. Ties
- D. Installation
- E. Misc.

M. Miscellaneous

- A. Electric wiring
- B. Water tanks
- C. Crushers
- D. Air receivers
- E. Power drills
- F. Diamond or churn drills
- G. Altering and remodeling plant equipment.

Improvements.—To this account will be charged such expenditures as building, remodeling, substitution of new machinery and equipment for worn out or obsolete and kindred outlays for improvement of existing works and foundations. It is quite likely that when improvements as noted are made the new work will undoubtedly be on a larger scale than that supplanted; possibly the cost may exceed that of the original; still it is deemed best in the line of conservatism to care for such improvements through profit and loss. Cases will arise, however, when the improvements may be so extensive or of such nature that in all fairness plant account should have a portion of the expense. In such case it will be proper to distribute a part of the cost. Each improvement should receive special consideration in this particular by the proper officials of the company and expenditures for same cared for on the mine accounts by numbers furnished by the General Office the same as noted above under New Construction.

The expenditures each month will be transferred to the General Office on vochers showing distribution of supplies and pay-roll.

Each mine must ascertain the probable amounts of improvements contemplated for the current year and during the eight months from April to November, inclusive, send to the General Office monthly a journal voucher for one-eighth of the total. This amount should be adjusted to cover additional requirements as soon as any changes from original estimates are made. The charge will be treated in the General Office in the nature of an Administrative Expense, shown on General Cost Sheet as a memo. only and charged off to profit and loss, through Mine Profit and Loss.

In making up the general balance sheet these two accounts will be stated together,

Improvement fund, \$										 			
Amount expended since										 			
Balance						 				 			

If expenditures exceed the provisional charges to Profit and Loss, therefore, the account will be shown as red ink liability. At the close of the fiscal year the balance as above (whether debit or credit) may be made the subject of special consideration, whether it should be finally closed into Profit and Loss, or carried forward to succeeding years. In connection with these expenditures, detailed monthly reports should be made.

Pertinent to the foregoing it is proper to say that occasions will doubtless arise when outlays are to be made for extensive improvements which in fairness to the operations of the years in which the same are made only a part of the contemplated outlay should be charged thereto. In such event only so much as the proper officials deem the amount the year ought to bear should be included in the provisional charge for the same.

The idea of handling outlays for improvements in the manner outlined is to take care, during the year, in reasonably equitable proportions, of expenditures which strictly speaking are in the nature of (1) a depreciation charge, in that they restore original property worn out or obsolete, and to cover which no provision for depreciation heretofore has been made, and (2) that they include outlays to strengthen the property, which in accordance with the best rules of business practice, a corporation in order to insure its right to live should provide from its current earnings. Monthly analysis of this account must be forwarded to the General Office on form 202, Fig. 16.

Note.—An appropriation blank should be made out for every expenditure, chargeable to either Improvement or New Construction, describing the nature of the proposed work and detailing the estimated cost. That when work contemplated provides for transfers of machinery or plant from other properties, the appropriation blank should show the fact and in addition the amount required to instal same.

This appropriation blank should be signed by the Superintendent or General Manager, one copy being sent to the President and two to the Auditor.

Miscellaneous Profit and Loss.—To this account will be charged or credited, as the case may be, all items of whatsoever nature, originating at the Mine or General Office, which are not directly chargeable to expense accounts, operating or plant accounts, such as receipts from sale of scrap, costs directly chargeable to accidents at the mines, etc., dismantling, handling and reconstructing machinery, etc. In other words, to take care of items not otherwise provided for and to keep accounts provided for on a comparative basis. All expenses of idle mines will be charged to "Mine Profit and Loss," "Winter Expense" if surface mines, which will be charged to Winter Expense and pro-rated against costs during the succeeding season.

NOTE.—No other charges are to be made at the mines to Misc. Profit and Loss unless specially authorized by the General Office, and changes or credits to the account must be fully analyzed on form 202, Fig. 16.

Insurance.—As no underwriter's insurance will be carried by properties (except boiler insurance, which will be handled through supplies and charged out equitably to steam production) it has been decided that we will carry our own insurance under the direction of the "Insurance Department" of the U. S. Steel Co.

The Manager's duties are:

- 1. After having made a careful examination of the various plants or properties, by himself or through his Inspectors, he will recommend the amount of Insurance that should be carried on the respective plants, etc., and the rate thereon. When the amounts and rates have been determined, they will be submitted to the President of the company interested for approval. If in his opinion any modifications should be made, they can be adjusted by correspondence or otherwise with the Insurance Department. In case of disagreement, the matter may be referred to the Comptroller for final adjustment.
- 2. The Inspectors of the Insurance Department will periodically make examination of the various plants for the purpose of ascertaining if proper precautions are taken against fire, and it will be the duty of the manager of the Insurance Department upon receipt of reports from his Inspectors, that proper precautions against fire are not taken, to immediately notify the President of the constituent company interested, making such suggestions for protection or otherwise as may seem in his opinion advisable. The carrying out of the suggestions will be within the discretion of the President of the constituent company interested.

In case of loss by fire the mines should immediately notify the President's office and the Auditor's office so that proper steps may be taken to have the Insurance Department investigate and report on such loss.

The plan as approved for the creation of the Insurance Fund and the disposing thereof is as follows:

After the amount of Insurance to be carried and the rates thereon have been established, as provided above, each company will distribute monthly one-eighth of the amount of premium during the months of April to November inclusive, to its costs of operations, crediting such amount to the "Fire Insurance" Fund. Quarterly each company will remit to the Treasurer of the U. S. Steel Co. in cash the amount of the Insurance Fund so set up for that quarter. The U. S. Steel Co. will credit each company with its contribution and invest the amount so received for the benefit of the fund, allowing each company semi-annually or annually credit for its proportion of the interest or dividends received on the fund, such interest or dividends, however, to be reinvested by the U. S. Steel Co. for the benefit of the fund.

In case of loss by fire, the company sustaining the loss will call upon the U.S. Steel Co. for reimbursement out of the fund; the difference will be charged to Profit and Loss of such company.

This plan is intended to cover Marine Insurance on vessels of the constituent companies, Marine and Fire Insurance on merchandise in transit, and insurance on merchandise stored in outside warehouses.

It will be noted that this plan practically makes each company its own insurer.

Marine Insurance.—As no marine insurance will hereafter be carried with underwriters a provision must be made by charging, "Ore at Lake Erie Ports" and crediting "Marine Insurance" Fund with 1/2 cent per ton (or such other amount as may hereafter be decided upon), for every ton of ore shipped via lakes, based on vessel weights.

Taxes.—The mine office will send on the first of each month from April to November, inclusive, to the General Office, a journal voucher charging Taxes and crediting Taxes Payable, with one-eighth of previous year's taxes paid, if no better information is to be had, and such amount

shown on mine cost sheet. As soon as assessments and rate of tax for current year can be obtained, this account must be adjusted to date by raising the amount to meet new conditions, or lowering it as the case may be.

Note.—Insurance and Taxes, except Marine Insurance, will be reported to the General Office for each month from April to November inclusive, such amounts being shown on the mine cost sheets as a memo. only, and taken up in the General Office Cost Sheet under their proper heading, Insurance to Cost of Ore, and Taxes to Administrative Expenses.

Depreciation.—In accordance with the best rules of business practice, a mining company, in order to insure its right to live should provide from its current earnings, a fund sufficient to cover all cost of property by the time its ore reserve is depleted. It is therefore necessary that depreciation be provided for all idle properties, which depreciation should be large enough (based on the best information obtainable for its ore reserve) to cover the total cost of property, including Improvements. The Mine Office should be kept in touch at all times with the General Office on this subject, advising promptly if any changes in conditions affecting ore reserves, which might cause them to increase or decrease the amount of depreciation. Such depreciation to be charged to Cost of Ore and credited to Sinking Fund or Development as the case may be.

Deferred Charges to Operations.—In order to keep costs at the mines on a comparative basis, it is necessary to defer certain charges and prorate them over the season, and in some cases a term of years. Expenditures of this nature will be transferred to the General Office and remain on the general books as an asset until closed off as depreciation or otherwise. Certain open-pit mines have expenses accummulating during the winter while not producing. These expenditures will be transferred to the General Office monthly, account "Winter Expense." As soon as navigation opens and production commences, such expense must be closed off in equal monthly amounts during the open season to operating costs. The mine making journal voucher charging "Ore at Mines" and crediting "Winter Expense" (Supplies and Pay-roll separately) and take such items into their current Mine Cost Sheet in detail.

Some mines have charges against "Stripping and Development," which expenditure should be transferred to the General Office monthly.

All mines will have charges account "New Shafts," such as Sinking or Raising, and Timbering New Shafts, or lowering old shafts for the further development of ore body. Such expenditures should be transferred monthly to the General Office.

The two latter accounts will be handled in the General Office by depreciation on such basis as will close off the charges before the ore body is depleted.

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INVENTORY ACCOUNTS

Mining Supplies.—All purchases or bills of whatsoever nature (excepting insurance and taxes) will be charges to mining supplies account, including freight, Freight Record, form 5, Fig. 1.

All charges to supplies must pass through the storehouse ledger, and be entered under one of the following headings or its sub-division (as many sub-divisions of accounts may be opened as is found necessary for properly keeping track of the stores). allowing the storekeeper to inventory them and check up at any and all times.

A report of all supplies charged will be forwarded to the General Office at the end of each month, showing each invoice, from whom purchased and amount of purchase, Fig. 2, form 236.

SUPPLY ACCOUNTS

Explosives Power Drill Castings Candles Wire Rope Oils Carbons Drill Steel Manilla Rope Chemicals g Minin Tools Mining Timber Fuel Forage Steam Packing and Waste **Electric Supplies** Pipe and Fittings Bolts, Nuts and Washers Steam and Water Hose Car and Locomotive Parts Air Drill Hose Steam Shovel Parts Rails Stationery and Printing Iron Castings Misc.

Absolutely no stores of any description will be issued from the store-house without a written order signed by the superintendent, or parties authorized by him, showing for what account the stores are to be issued, and the ticket shall be accepted as a receipt from the party ordering the supplies except in case of contractors, when receipt shall be taken from party to whom supplies are delivered. ticket will be the store-keeper's authority for making his charges against the proper account. These tickets must be entered up daily in the summary book, and at the end of the month must be summarized and charged to the proper operating or

other account and credited to their proper account in the store-house ledger.

Supplies Consumed.—Form 115, Fig. 14, must cover the total amount of mining supplies consumed or taken out of the storehouse, during the month, except amounts shown on form 113, Fig. 12, pay-roll collections, such supplies being charged to operating, New Construction, Improvements, Accounts Receivable, Cash Sales, or other mine supply accounts. The summary of supplies consumed for the month, form 2, Fig. 10, furnished by the supply clerk, should include every item of supplies distributed during the month, the same being divided into three divisions.

- 1. Supplies charged to Operating and Construction.
- 2. Supplies charged to Other Mines.
- 3. Supplies Sold, which are charged to cash sales, or to Accounts Receivable, as the case may be, a detail of such Accounts Receivable being attached to the journal voucher.

Stores used during the month must be transferred to the General Office by journal voucher (form 115, Fig. 14), showing for what they were used.

Supplies Manufactured.—In manufacturing Tram cars, Skips, Cages, etc., all labor and supplies used in the manufacture of such articles will be charged to supplies, until such articles or series of articles are completed, in order to make one charge to operation or construction when used.

Supplies, Profit and Loss.—As mining supplies cannot come out exactly at the end of the year, it is necessary to charge a small percentage on the stores used during the year to cover leakage, etc., although great care should be used so as not to show any great difference between the book value and the inventory value of this account. Of the two, however, between a loss or gain it should show a small gain. In order to keep the book value of supplies on a par with the actual value, the storekeeper should take inventory of different classifications as often as possible and compare quantities on hand with book quantities, correcting his book quantities to agree with actual inventories and correcting average prices to take care of any discrepancies which he may discover.

Supplies Purchased.—Form 236, Fig. 2. This Statement should cover all purchases of whatsoever nature going into the supply account. The statement on the back should be filled out showing the balance on hand the first of the month, plus purchases for the month as shown on front of the sheet and credited with the three divisions mentioned above, and showing the balance on hand. This statement should agree absolutely with the charges on supply ledger, form 6, Fig. 3, and the three items should agree with the summary of supplies as outlined above.

"Ore at Mines."—Representing cost of producing "Ore at Mines"

made up from ledger charges for mining labor and supplies (Operating Expense), Direct Expense, Depreciation, Insurance and Profit and Loss.

Ore at Upper Ports.—Representing cost of ore shipped to Upper Ports at average cost of Ore at Mines, plus Royalty, plus Rail freight to F. O. B Upper Port deliveries.

Ore at Lower Ports.—Representing cost of ore shipped to Lower

	STATEME	ENT.
	MINE VOUCHERS	MINE
Suppli	ss Purchased and Charged to Mine Supplie	s during Month of
MINE No.	PURCHANED FROM	AMOUNT MEMO. REMARKS
	Mine Supplies Balance	
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Fig. 2.—Form 236.

Ports at average cost of Ore at Upper Ports, plus Rail freight to Upper Ports, plus Lake freights, plus Marine Insurance.

Note.—Ore at Mines will be credited and Upper Ports charged with all ore shipped from mines, including ore wrecked in transit or sold F. O. B. Mine. Ore at Upper Ports will be charged with all ore shipped from mine without regard as to receipts at dock (for royalty purposes),

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Fig. 3.—Form 6.

and will be credited with all shipments from dock, as well as ore wrecked in transit and sales either F. O. B. Mine or dock. It will also be charged or credited with profit and loss, as the case may be, on all sales of ore at mines or Upper Ports.

Ore at Lower Ports will be charged with all ore received from Upper Ports, at average price at Upper Ports, plus Transportation charges, Marine Insurance and Shrinkage (although carried at vessel tonnage until overrun or shortage develops), and to be credited with all sales from Lower Ports at selling value. The difference or profit and loss on sales, debited or credited to this account, as the case may be, to maintain the avarage cost of ore.

Pay-rolls.—The Pay-rolls at the mines should show each employee, by number, name, and occupation, whether contract or company account rate and amount of wages, deduction if any, balance due employees and separately, amounts due outsiders on account of orders and deductions from employees wages.

The total amount of these orders and balance due employee making the total amount of the monthly Pay-roll.

As soon as the Pay-roll is made out, a voucher (form 116, Fig. 13) must be sent to the General Office, showing the various accounts and to what charageable, such as:

Direct Expense								
Operating								
General Repairs								
Total Operating								
New Construction.								
Improvements								
etc., etc.								
Total Pay-roll								

The total making the full credit to Pay-roll, plus any credits for sundry items collected from sales and otherwise. Accounts Payable voucher

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Fig. 4.—Form 100.

must be made out showing the total amount of the Pay-roll less sundry credits representing collections on Pay-roll, and net amount required to settle the Pay-roll in cash. This voucher will be sent with check to bank handling the mine account, and check passed to credit of the mine,

subject to check of Mine Superintendent or Cashier, less advances made during the month.

A list must be kept of all checks (form 100, Fig. 4) and forwarded to the General Office each month as issued, showing the number of check and amount, spoiled checks being returned to the General Office with such list. All uncalled-for checks at the end of 60 days must be returned to the General Office, where the amount will be placed to the credit of Unclaimed Pay-roll Account, and a record kept of the number, name, month and amount of each. In case check is called for later, it must be paid and charged on petty cash voucher, and the General Office so notified to enable them to correct their record of unclaimed money. Unclaimed Wage account will be closed off to Profit and Loss account every six months, for wages over one year old.

Statistics.—Pay-roll statistics will be sent to the General Office as promptly as possible after the first of the month showing the following information:

"Total amount of Pay-roll" covering the full amount of the regular mine Pay-roll, as well as proportion of District Office Pay-roll chargeable to the mine.

"Total number of days worked," should cover the full number of days shown on the mine Pay-roll, as well as proportion of days in District Office Pay-roll.

"Total number of names on roll," covering every name on the Payroll without duplication as well as arbitrary proportion of names in District Office Pay-roll.

"Average number of men....days each." The average number of men will be obtained by dividing the total number of days worked by the number of working days in the month. The working days in the month will be the full number of days in the month except Sundays and legal holidays, being New Year's Day, Decoration Day, July Fourth, Labor Day, Thanksgiving Day, Christmas and regular state and national election days.

"Average rate per day, Company account." The rate is obtained by dividing the total number of days worked company account into the total amount of Pay-roll Company account, including proportion of District Office Pay-roll.

"Average rate per day, Contract account." This rate is obtained by dividing the total number of days worked Contract account into the total amount of Pay-roll Contract account. This Contract account should be divided into three divisions, Miners, Trammers, and Others.

"Average rate per day all labor." This rate is obtained by dividing the total number of days worked into the total amount of Pay-roll including proportion of District Office Pay-roll. "Average rate per month." This rate is obtained by dividing the total amount of Pay-roll by the average number of men working full time. The result can be checked very closely by multiplying the average rate per day all labor, by the number of days worked full time by each man during the month.

"Production During the Month." This figure is taken from form 150.

"Tons per man per day." This figure is obtained by dividing the production for the month by the total number of days worked, including proportion of District Pay-roll.

Note.—In all cases the figures shown as Pay-roll Statistics should be the same as figures shown on Labor Statement, as should the average figures on the cost sheet for rate per day, etc., be the same as shown on Pay-roll Statistics.

For our outside explorations, one form may be used except where we are working some large important property that may soon develop into a mine. In such cases as the latter use a separate form for each.

RECEIPTS AND DISBURSEMENTS

Receipts.—No receipts of the following nature should be treated as any part of mining costs, but transferred to the General Office as receipts or income if received at mine office.

Interest on Investments.

Interest on Bills Receivable and Accounts.

Rentals received from detached property, such as lots, miners, dwellings or machinery.

Special general receipts.

Cash Discount on purchases.

Disbursements.—No disbursements of the following nature should be treated as part of mining costs, but should be transferred to the General Office if originating at the mines.

Interest on Bonded or Mortgage debt.

Interests on Loans and Bills Payable.

Interest and Discount.

Taxes.

General, Administrative and Selling expense.

NOTE.—In the General Office, all items above mentioned are Profit and Loss items, and will be shown on general balance sheet under that heading, in addition showing on General Office Cost Sheet as memo.

PRODUCTION AND SHIPMENTS

Daily.—A daily report will be sent to the General Office showing the Number of Men Employed (classified), Tons of Ore Produced, Shipments

from Mines and Docks, and Changes in Stockpile, also analysis as requested.

This report must show the estimated production and shipments each day, the overrun and shortages taken up each day, as fast as actual weights are received. Notation to be made on adjusted daily report for month, in footnote, showing difference between shipments, as shown on this report and form 150. The difference is always caused by cars in transit.

Monthly.—This report must show the actual amount of ore produced during the month, which should be based on actual shipments from pockets (actual R. R. weights) plus estimated pocket shipments in transit at end of the month, plus estimated tonnage stocked during the month, less estimated ore in transit (from pockets) at end of previous month, as follows:

January Production	Tons
Actual R. R. weights	
Estimated ore in transit	
Estimated ore stocked	
Production for January	
February Production .	Tons
Actual R. R. weights returned	
Estimated ore in transit	
Estimated ore stocked	
Less estimated ore in transit previous month	
Production for February	

Any overrun in cleaning up stockpile should be treated as production for season only, on cost sheet.

On this report it will be shown in column, "Stockpile overrun month," during the month in which overrun develops, being footed with "Current month" and "Previous month" and working total since January 1.

On succeeding months since January 1, becomes "Previous months" this leaving blank "Stockpile Overrun Month" except for overrun which may develop in that month. In other words, "Stockpile Overrun Month" will show only the overrun developing during the current month. This form should be made up showing the following:

Each mine by grades separately, making total of each mine and grade, total of each group of mines, each total and grand total proving itself as follows.

"Current months plus previous months and stockpile overrun month

(in current month as above), should equal total since January 1, plus on hand January 1, should equal "Total Produced and in Stock," less "Total Mine Shipments" should equal "Balance in Stock." Overrun Stockpile for season is a memo. and proves with nothing except your stockpile ledger. It should show at all times the accumulative overruns and shortage for the season. (Shortage showing in red ink.) The Dock Statement should show the amount in docks January 1, plus seasons accumulative shipments to docks, making total, and less accumulative shipments from docks, leaving balance in docks, which should check with R. R. company's dock report. Tonnage shown in this report should be the same in Mine Cost Sheets in order to agree with General Office Cost Sheet made from these figures.

Shipments.—As shown on form 150 should be actual shipments as shown by the R. R. company on their statements for the month. No other figures for shipments should go on the report. They should agree with the Royalty Statement furnished. "Balance in Stock" at the end of each month should be the difference between "Total Produced and in Stock" for the season, less shipments for the season. This should be checked with the Stockpile Ledger, the difference between this report and the Stockpile Ledger being the amount in transit.

Form 150 is intended for the auditor's office only. Shipments by vessel should show bill of lading and railway weight. This report should also show, as stated above, the ore lost in transit and the all-rail shipments. The total of this report should be checked by deducting 1 per cent. of the railroad weights to see that it approximates out the total of the amount as shown by the vessel weights. If there is a large difference, the weights should be checked over to see if there has been a mistake made.

Overruns and Shortages.—As weights reported each day would be based on estimates, it will be necessary to correct such estimates at the earliest opportunity.

Reports from railroads during shipping season of actual weights should be received within two days from date of shipment. Any difference between estimates and actual weights should be added or subtracted, as the case may be, to the estimates for the next day on Production, Dock account, Shipment from mines, and Stockpile, if affected.

When stockpiling ore the greatest care should be taken in making estimate of production, and a record must be kept of each stockpile separately, charging the pile with the estimated ore put into it, and crediting it with the actual shipments made from it. As each stockpile is cleaned up the overrun or shortage which develops on the pile must go on form 150, and on cost sheets in the seasons column, for the month in which the stockpile is cleaned up, and the overrun or shortage. A large

overrun or shortage, if thrown into the monthly cost, would make it out of proportion with other months.

Largely underestimating or overestimating amounts of ore which go into stockpiles, so that a large percentage of overrun or shortage is developed, will be considered a reflection on the watchfulness of the superintendent. In case we should develop a shortage, and it is hard to say just how much leeway should be allowed, and what percentage of overrun would be right. In any event it should not exceed 5 per cent., and if it could be brought to one-half that per cent, the cost for each month through the year would be on a better basis, and would be more nearly correct. If an overrun develops on a certain pile, it must be shown as overrun on that pile. The same if a shortage develops. no case must the overrun from one pile be used to cover shortage in another pile, or any part of it be taken to increase the current month's production. Neither must any part of the production during the month at any time be used to cover up any shortage which may develop on any stockpile. In all cases the production and shipments, overruns and shortages must be correctly shown.

Transfer of Supplies, Labor Charges, Etc.—All transfers of mining supplies, shop labor, etc., must be reported to the General Office on form 115-6, Figs. 13 and 14, as the case may be, sending original invoice only to the receiving mine, who will take same up in the supply account in the same month in which it is rendered without regard to receipt of goods or correctness of billing. If goods do not arrive as invoiced or invoice is not correctly rendered, such corrections or shortages will be reinvoiced to the shipping mine in the succeeding month. Any controversy as to prices or adjustments will be referred to the auditor for settlement.

It will not be necessary to send copies of such invoices to the General Office unless a controversy arises, but will be sufficient for the shipping mine to show same against each mine on their distribution vouchers and the receiving mine to enter same on record of supplies purchased.

Transfer of Plant.—All transfers of plant property, such as buildings, machinery, etc., should be reported to the General Office on triplicate invoices without values sending the original and duplicate invoices to the receiving mine, who will approve and report same in the usual manner.

Values of plant transfers will be fixed by the mechanical engineer, and entries made on the general books only to cover such transfers. Memo. entries should be made on the mine books of all transfers, both from and to other mines, and at the end of the month a statement made of the shipments and receipts during that month to the General Office.

This statement to cover merely the plant transferred and to what mine it was shipped or from what mine it was received.

No machinery or supplies will be loaned to another mine, but proper transfer made of all equipment or plant transferred, except in case of machinery rental, such as steam shovels, diamond drills, etc. No machinery should be carried in plant account that is located at another mine or exploration but proper transfer made to such mine or exploration on the general books.

As a general proposition, machinery transferred to another mine is worth no more to the receiving mine on account of such transfer, therefore no expense should be added to the value of such plant by reason of such transfer. Hereafter the shipping mine will stand the expense of dismantling property loading and placing F. O. B. cars, the machinery or property transferred, charging such expenses to mine Profit and Loss.

The receiving mine will stand all expenses from this point, such as freight, unloading and handling charges, and installation, charging same to Improvements. If, however, in connection with installing this plant there is any large improvement intended, which will materially increase the value of the plant transferred, it should be taken up with the General Office and a special ruling made in such cases.

The shipping mine shall word their invoices giving description, etc., of all machinery shipped, using the exact words and numbers as shown on inventory of Dec. 31 last, and the receiving mine shall enter on their inventory the exact description as shown on the invoice.

Machinery Rentals.—This is a matter that should be discouraged as much as possible. In case of steam shovels when some of the mines would have use for their shovels only a small part of the year, and other mines have at times idle shovels, also in case of diamond drill outfits, when they desire to use them only temporarily, it becomes necessary to take care of these items in the way of a rental from one mine to another. This rental should be handled practically on the basis of cost. In other words, a greater rental should not be charged for the use of the steam shovel or diamond drill outfit than the necessary wear and tear on machinery, and the cost of putting the machinery into its original condition. All income from machinery rental should be transferred to the General Office, therefore it would be proper that any expense of the proprietor mine to whose plant the machinery is charged, to charge against this machinery rental, the cost of any repairs necessary to put the machine back into its original condition when it left the mine.

It might be well to state further that the plant account of the various mines belongs to the company as a whole, that they are given to one mine without charge for the purpose of getting out ore, and such mines taking up in the cost of operating only the necessary charges of keeping

such plant in repair. Therefore it is not a good accounting proposition for the General Office to charge a profit on the machinery used at another mine in order to take up a corresponding loss on the same transaction.

The same would also apply to Tenement rentals, the income occurring therefrom being transferred to the General Office. Therefore repairs necessary on such tenements, and the insurance necessary to keep them protected should be charged against the same account. There should not, however, be a loss to the General Office on the income account, and should any loss develop, at the end of the year it will be taken out of the Rental account and transferred to Misc. Profit and Loss of the mine owning the buildings or machinery.

MINE ACCOUNTS-MINE BOOKS (UNDERGROUND MINES)

General ledger Controlling accounts	Sub-accounts	Distrib	uting accounts
General Office	101. Explosives	A. Steam p	production
1	103. Oils	B. Electric	power
	104. Drill steel		P002
Inventory	105. Lumber 106. Mining timber 107. Tools	C. Shop expense	Machine shop Carpenter shop Smith shop
Bank	108. Steam packing and waste 109. Pipe and fittings	D. Compre	ssor and drills
	110. Steam and water hose 111. Air drill hose	E. Teaming	g
	112. Steel rails	F. Repairs	
Gunnling	113. Iron Castings		
Supplies	114. Power drill castings 115. Wire rope 116. Carbons 117. Manilla rope	G. Laborat	ory
Petty Cash	118. Chemicals		
1 coty Cami	119. Fuel	1	
	120. Forage	1	
	121. Electric supplies	ł	
Loss and Gain	122. Bolts, nuts and washers		
	123. Car and locomotive parts		
	124. Steam shovel parts		
Taxes	125. Stationery and printing		
	126. Misc.		

MINING IRON ORE

MINE ACCOUNTS-MINE BOOKS (UNDERGROUND MINES

General ledger Controlling accounts	Sub-accounts	Distributing accounts
Insurance	200. Development in rock	-
	201. Development in ore	
	202. Stoping	•
	203. Timbering	
Rents	204. Picking and storing rock	
	205. Tramming by hand	
District	206. Tramming by power	
Expense	207. Cage and skip tenders	
Mining	208. Pumping	
Expense	209. U. G. tracks	
	210. Mining captains	
	211. Shift bosses and timekeepe	ers
	212. Dry and change houses	
	213. Mine exploration	
	214. General U. G. expense 215. Rock filling	
	216. Steam shovel	
Surface Expense	225. Hoisting 226. Stocking and sorting ore 227. Shipping ore from pockets 228. Loading stockpile, steam si 229. Loading stockpile hand 230. Stripping 231. R. R. tracks 232. Breaking and crushing ore 233. Surveying and chemistry 234. Office expense 235. Warehouse 236. Contributions 237. Personal injuries 238. General surface 239. Misc.	
	240. Grading highways	
New Construc	A separate account for each ing and equipment of each See details on page 10.	
Improvements.	A separate account with each jo See details, page 12.	b.
Accounts Receivable		

ADMINISTRATIVE EXPENSES

Taxes.
Interest and discount.
General expense.
Improvements.
Total cost of ore.

Note.—Cost of production is calculated on mine product. Royalty is calculated on shipments from mine. Transportation is calculated

on shipments from docks to Lake Erie.

Administrative Expenses charged to Profit and Loss account, shown as a memo. only.

DISTRIBUTING ACCOUNTS

A. Steam Production.—Labor and supplies, including firemen, coal passers, fuel, water supply for boilers, oils and light, repairs to building, boilers, boiler insurance, etc. Intended to cover all cost of producing steam for whole plant.

The full cost of producing steam for the month will be apportioned against Hoisting, Pumping, Shops, Compressor and Drills, Electric Plant, Dry and Change house, and Heating in the proper proportion, as shown by the indicator of steam used for each, excepting when the steam from one or an entire battery of boilers is used exclusively for one power, where it will be charged against that power. In the absence of proper indicators to show amount of steam used for each, it must be arrived at by careful tests.

B. Electric Power.—Labor and supplies, including proportion of engineer's time, all supplies used in connection therewith, repairs to machinery and buildings, as well as proportion of steam used to run dynamo.

ENGINEER'S LOGS

Daily Log.—The daily log is to be made out for each plant; such information as is called for will be filled in by the engineer in charge. When a plant consists of more than a Hoistand Boilers; that is, it may also comprise a compressor, pumping engine, and electric engine, the engineer in charge of the compressor will furnish all information called for, form 101, Fig. 5.

Monthly Log.—The totals and averages of the daily logs for the month will be taken and entered on the "Monthly Summary of Engineer's Logs" under the proper plant heading; this summary provides for all plants operated, form 102, Fig. 6.

Fig. 5.—Form 101.

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FIG. 6.—FORM 102.

The full cost of electricity, carbons, etc., to be apportioned against the various accounts for which it is used in the proportion of electricity consumed by them. Electric lights to be charged against the account benefited, such as Office, Hoisting, Steam plant, etc.

C. Shop Expense.—Labor only, except as herein-after mentioned. All labor at Machine, Smith and Carpenter shops and Master Mechanic's time will be charged to shop expense, a close record being kept of time expended for and against the various accounts in the distribution of shop expense at the end of the month.

All the material used in the shops for the various operating accounts must be reported to the storekeeper daily, who will charge them direct from stores, except general items, such as Steam, Electricity, Coal, Borax, etc, which will be apportioned against the various accounts, pro-rated on a basis of labor performed.

D. Compressor and Air Drills.—Labor and supplies, including proportion of engineer's time used in running compressor, repairs to machinery and buildings, oils, waste, etc., pipe lines and repairs to same, hose and pipe for replacement, proportion of steam consumed, or other power used.

The full cost of running compressor for the month will be apportioned against the various accounts for which it is used, such as Pumping, Development in Rock or Ore, Stoping, etc., on a basis of labor performed at drilling under the above heads, and when for outside purposes, such as Pumping, or Hoisting, a proportion based on steam cost for same work, plus an extra charge on account of an increased cost of air over steam.

- E. Teaming.—To this account should be charged the cost of stables, teams, teamsters, etc., for the month (except the cost of keeping mules for tramming purposes underground, which is chargeable to accounts 200-1-6). A close record must be kept during the month of work done for the different cost accounts and the same subdivided on an equitable basis against the various accounts for which the work was done.
- F. Repairs.—All repairs are chargeable direct to cost accounts affected, such as repairs to skips, to cars, to Hoisting, etc., but for the purpose of showing on General Office Cost Sheet the amount expended for repairs and maintenance, all repairs must be separated on vouchers of supplies and labor from operating when sent to the General Office.
- G. Laboratory.—To this account should be charged all supplies used or labor performed during the month in making analysis, in fact all cost in connection with running the laboratory.

The full cost of analysis made during the month should be ascertained from the number of analysis made, and that rate used in charging out to operation, or other mines or parties, to balance the account except as noted below.

Note.—All operating accounts including shop expense, laboratory, teaming, etc., should be handled on a cost basis and only the cost of such work charged to operation, or any of our other mines. In the case of work done for outsiders, a profit (to be determined by the management) should be added to this cost and such profit transferred to the General Office as a credit to Mine Profit and Loss.

MINING EXPENSE ACCOUNTS—UNDERGROUND MINES

- 200. Development in Rock.—Labor and supplies, including cost of miners, drillers, loading tram cars, and material used in drifting and cross-cutting, sinking or raising in rock, as well as its proportion of Compressor and Air Drill cost as shown consumed for that purpose.
- 201. Development In Ore.—Labor and supplies, including cost of miners, drillers, loading tram cars, and material used in driving main drifts raises or winzes in ore, as well as its proportion of Compressor and Air Drill cost as shown consumed for that purpose.

Note.—The above account not to include the cost of sinking or raising shafts, which will be charged to Sinking Shafts, and be treated in the General Office as deferred charges to be closed by depreciation.

Show the Number of Feet on Labor Statement of Drifting, Cross-cutting, Sinking or Raising shafts, Raises, Winzes, in ore and in rock separately.

202. Stoping.—Labor and supplies, including cost of mining, drilling, blasting and breaking down the ore body (except as per account 201) as well as wheeling ore to chutes and all shoveling in connection with same, and its proportion of Compressor and Air Drill cost as shown consumed for the purpose.

NOTE.—Stoping to include all mining on sub-levels except main raises and winzes from main levels.

- 203. Timbering.—Labor and supplies, including cost of all timbering in main openings, raises, and stoping work, as well as proportion of the miners labor on timbering to be charged to this account, and extraordinary repairs to shafts; ordinary repairs to shafts must be charged to Hoisting expense.
- 204. Picking and Storing Rock.—Labor and supplies, including all cost of picking and storing rock underground.
- 205. Tramming by Hand.—Labor and supplies, including all cost of tramming, shoveling, and taking ore from chutes on main levels or such sub-levels as cannot be reached by main level openings.
- 206. Tramming by Power.—Labor and power, including all cost of tramming, shoveling, and taking ore from chutes or main levels or such sub-levels as cannot be reached by main level openings, cost of keeping

live stock, mule drivers and when used, the proportion of electricity used for that purpose.

- 207. Cage and Skip Tenders.—Labor only, including checkers and bell ringers.
- 208. Pumping.—Labor and supplies, including pumpmen, pipemen, repairs and proportion of steam production used for pumping.
- 209. U. G. Tracks.—Labor and supplies and repairs on U. G. tracks, except original cost of steel rails (new) to be charged to New Construction; when used for replacement to be charged to this account.
 - 210. Mining Captains.—Labor only.
 - 211. Shift Bosses and Timekeepers.—Labor only.
- 212. Dry and Change Houses.—Labor and supplies, including all cost of running change houses, as well as steam used for heating purposes, repairs to building, etc.
- 213. Mine Exploration.—Labor and supplies including prospecting and diamond drilling.
- 214. General U. G. Expense.—Labor and supplies, including cost of ditches and other misc. items for which no provisions are made in above accounts.
- 215. Rock Filling.—Labor and supplies, including all cost of loading rock on surface by hand or steam shovel, tramming or switching it to the shaft, lowering it into the mine, tramming and storing it underground. This applies only to rock taken into the mine from surface and does not cover any expense of picking and storing rock underground.
- 216. Steam Shovel.—(Stoping in Pits.) Labor and supplies, including all cost of loading ore by steam shovel in open pits.

SURFACE EXPENSE ACCOUNTS-UNDERGROUND MINES

- 225. Hoisting Expense.—Labor and supplies, including engineers (except proportion charged to electric plant, shops, compressors, etc.), as well as all oils, waste, light, brakemen and helpers, proportion of steam power, or electricity used for hoisting, repairs to skips, shafts, replacements of hoisting ropes, and ordinary repairs to shaft house.
- 226. Stocking and Sorting Ore.—Labor and supplies, including landing, dumping and tramming ore and rock on stockpile and preparation of stockpile bottoms and trestles.
- 227. Shipping Ore From Pockets.—Labor and supplies, including cost of tramming rock on surface during shipping season.
- 228. Loading Stockpile, Steam Shovel.—Labor and supplies, shipping stockpile, including cost of operating steam shovel, crew's wages, etc.
- 229. Loading Stockpile by Hand.—Labor and supplies, including cost of shipping stockpile when loaded by hand.

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- 230. Stripping.—Labor and supplies, including drilling and blasting of surface, teams hauling dirt and all expense in connection with stripping open pit operations.
- 231. Railroad Tracks.—Labor and supplies, including cost of constructing surface railways, switches, etc., of broad gauge pattern, as well as all repairs to same, except new rails.
- 232. Breaking and Crushing Ore.—Labor and supplies, including all cost of reducing lump ore to required size, by hand or power.
- 233. Surveying and Chemistry.—Including all cost of engineering department, running laboratory, chemicals, etc. (except work done for outside parties or our other mines having no laboratory or engineer of its own).
- 234. Office Expense.—Labor and supplies, including all cost of running the office at the mines, as classified in General and District Expense.
- 235. Warehouse.—Labor and supplies, including salary of store-keeper and whatever supplies are consumed during the month to operate same.
- 236. Contributions.—Labor and supplies, to include contributions of whatever nature made at the mine, as authorized by the General Office.
- 237. Personal Injuries.—Including donations or whatever voluntary contributions, judgments or forced settlements, salaries and fees of surgeons and attendants, including hospital expenses, medical supplies, etc. Intended to cover all expenses of the mine on account of personal injuries.
- 238. General Surface Expense.—Labor and supplies, including surface items not otherwise provided for.
 - 239. Miscellaneous.
- 240. Grading Highways.—Labor and supplies, including all cost of grading public roads, crossing caving territory, ordinary expense of surfacing and grading mine roads is chargeable to account No. 238.

Note.—Above cost accounts represent the division of operating expense at the mines and from which the mine cost sheet is made.

Taxes and Insurance will show as a separate item below these on the cost sheet, and will be transferred to the General Office by journal voucher.

The cost of operating for the month is transferred to the General Office, by journal voucher of labor and supplies, and will be the total as shown by the Mine Cost Sheet for Operating Expense. Copy of Mine Cost Sheet must be sent to the General Office as soon as completed.

MINE ACCOUNTS-MINE BOOKS (OPEN PIT MINES)

General ledger Controlling accounts	Sub-accounts	Distributing accounts
General Office	101. Explosives 102. Candles	A. Steam production
	103. Oils	B. Electric power
	104. Drill steel 105. Lumber	C Commence and air deith
Inventory	106. Mining timber	C. Compressor and air drills
an volution y	107. Tools 108. Steam packing and waste 109. Pipe and fittings	D. Shop expense Machine shop Smith shop Carpenter shop
Bank	110. Steam and water hose repairs 111. Air drill hose 112. Steel rails	E. Teaming
Supplies	113. Iron castings 114. Power drill castings	F. Repairs
	115. Wire rope 116. Carbons 117. Manilla rope	G. Laboratory
Petty Cash	118. Chemicals 119. Fuel 120. Forage	
Loss and Gain	121. Electric supplies 122. Bolts, nuts and washers 123. Car and locomotive parts	• •
Taxes	124. Steam shovel parts 125. Stationery and printing 126. Misc.	
Insurance	250. Stripping by hand 251. Teaming	
	252. Mining captains 253. Shift bosses and timekeepers 254. Water supply	
Rents	255. Lighting 256. Drilling and blasting	
District	257. Track expense 258. Waste pile expense	
Expense	259. Operating locomotives 260. Repairs to locomotives and o	ears
Winter	261. Operating steam shovels	
Expense	262. Repairs to steam shovels	
Stripping and	263. Office expense	
Development	264. Warehouse	
i i	265. General stripping expense	

MINE ACCOUNTS-MINE BOOKS (OPEN PIT MINES)-Concluded

General ledger Controlling accounts	Sub-accounts	Distributing accounts
Mining Expense	275. Mining by hand 276. Teaming 277. Mining captains 278. Shift bosses and timekeepers 279. Water supply 280. Lighting 281. Drilling and blasting 282. Track expense 283. Pumping 284. Operating locomotives 285. Repairs to locomotives 286. Operating steam shovels 287. Repairs to steam shovels 288. General repairs 289. General mining expense 290. Surveying and chemistry 291. Office expense 292. Warehouse 293. Contributions 294. Personal injuries 295. Removing rock in ore body 296. Stockpile expense	
New Construc-	A separate account for each building and the equipment of each plant. See details page 10.	
Improvements Accounts Receivable	{ A separate account for each job. } See details page 12.	

MINING EXPENSE ACCOUNTS—OPEN PIT MINES

Winter Expense.—All expenses in connection with open pit mines from the close of navigation to the opening of navigation next year will be charged to Winter Expense.

Such expense will be taken care of in eight monthly amounts by charge to operations of one-eighth of the total amount each month from April to November inclusive. The expense accruing during the

winter will be separated according to the cost sheet and extra items prorated against regular costs in equal monthly amounts.

Note.—The above charges apply to mining expense only. The Stripping and Development charges will be handled in the usual manner, by charging the expenditures monthly to Stripping and Development.

STRIPPING AND DEVELOPMENT

- 250. Stripping by Hand.—Labor and supplies, including wheelers, shovelers, and supplies used in stripping by hand.
- 251. Teaming.—Labor and supplies, including all costs of teams and labor while at stripping, or work in connection with stripping.
- 252. Mining Captains.—Labor only, to be divided on a basis of locomotive and steam shovel labor on stripping or in ore, latter to be charged to mining account No. 277.
- 253. Shift Bosses and Timekeepers.—Labor only, on same subdivision as account No. 277.
- 254. Water Supply.—Labor and supplies, including cost of pumping plant, pipe lines, and pipemen and water carriers, for water supply of locomotives and steam shovels while on stripping.
- 255. Lighting.—Labor and supplies, including proportionate cost of dynamo, where electric lights are used, divided on same basis as No. 252.
- 256. Drilling and Blasting.—Labor and supplies, including drilling, powder gang and explosives while on stripping.
- 257. Track Expense.—Labor and supplies, including track men, rails, spikes and ties (except cost of permanent track in new mine, to be charged to New Construction), all repairs to permanent or temporary tracks to be charged to No. 257. Tracks in ore to be charged to No. 282.
- 258. Waste Pile Expense.—Labor and supplies, including trackmen on waste pile trimmers and cost of keeping track in repair on waste pile.
- 259. Operating Locomotives.—Labor and supplies, including fuel, engineer and firemen, brakemen, and signal men and all cost of running waste trains (except water supply).
- 260. Repairs Locomotive and Cars.—Labor and supplies, including full cost of repairs on cars, and proportionate cost of repairs on locomotives, as between stripping and ore.
- 261. Operating Steam Shovels.—Labor and supplies, including engineers, firemen and cranesmen, while on stripping.
- 262. Repairs. Steam Shovels.—Labor and supplies, while on stripping.
- 263. Office Expense.—Labor and supplies, including all cost of running the office of the mine, as classified in General and Direct Expense.
 - 264. Warehouse.—Labor and supplies, including salary of store-

keeper and whatever supplies are consumed during the month to operate same.

265. General Stripping Expense.—Labor and supplies, including all surveying and other expenses not otherwise provided for than stripping.

266. Contract Stripping.—Including all cost of stripping paid outsiders on account of contracts.

MINING EXPENSE

- 275. Mining by Hand.—Labor and supplies, including wheelers, shovelers and miners as well as material used in mining by hand.
- 276. Teaming.—Labor and supplies, when working in ore or in connection with mines working in ore.
- 277. Mining Captains.—Labor only, to be divided on basis of locomotives and steam shovels, labor on stripping or in ore. Stripping proportion to be charged to account No. 252.
- 278. Shift Bosses and Timekeepers.—Labor only, on some division as account No. 277.
- 279. Water Supply.—Including cost of pumping plant, pipe lines and pipe men and water carriers for water supply of locomotives and steam shovels, while working in ore.
- 280. Lighting.—Labor and supplies, including proportionate cost of dynamo where electric lighting is used when working in ore.
- 281. Drilling and Blasting.—Labor and supplies, including drillers, powder gang and explosives while working in ore.
- 282. Track Expense.—Labor and supplies, including track men, rails spikes, and ties (except cost of permanent track in new mine to be charged to new construction). All repairs to permanent or temporary tracks to be charged to account No. 282 when laid and used for working in ore. Stripping tracks to be charged to account No. 257.
- 283. Pumping.—Labor and supplies, including all cost of pumping, when pumping is necessary in wet mines, except as used for accounts 254 and 279.
- 284. Operating Locomotives.—Labor and supplies, including fuel, engineers and firemen, brakemen and signal men, when working in ore.
- 285. Repairs to Locomotives.—Labor and supplies on locomotives when working in ore.
- 286. Operating Steam Shovels.—Labor and supplies, including engineers, firemen and cranesmen when working in ore.
- 287. Repairs to Steam Shovels.—Labor and supplies, when working in ore.
- 288. General Repairs.—Labor and supplies, including all repairs to building and machinery not otherwise provided for.

- 289. General Mining Expense.—Labor and supplies, including car checkers, billers and other expenses not otherwise provided for.
- 290. Surveying and Chemistry.—Including all cost of engineering department, running laboratory, chemicals, etc. (except work done for outside parties or our other mines, having no laboratory or engineer of their own).
- 291. Office Expense.—Labor and supplies, including all cost of running the office at the mines, as classified in General and Direct Expense.
- 292. Warehouse.—Labor and supplies, including salary of supply clerk and whatever supplies are consumed during the month to operate same.
- 293. Contributions.—Labor and supplies, to include contributions of whatever nature made at the mines as authorized by the General Office.
- 294. Personal Injuries.—Including donations, or voluntary contributions, judgments, or forced settlements, salaries and fees of surgeons and attendants, including hospital expense, medical supplies, etc. Intended to cover all expenses of the mine on account of personal injuries.
- 295. Removing Rock in Ore Body.—Labor and supplies, including all cost of loading and handling rock encountered in the ore body, including the cost and time of steam shovel, locomotives and hauling of such rock to waste pile.

NOTE. -No low-grade ore or lean ore to be included in this account.

296. Stockpile Expense.—Labor and supplies, including all cost of stockpile, low-grade or lean ore.

Note.—Only the mining expense of Missabe mines will be treated as operating expenses. The stripping cost will be transferred as a separate item in total and treated as an asset in the General Office cost until extinguished, although the cost of stripping will be shown as outlined above on the Mine Cost Sheet.

The cost of operating for the month is transferred to the General Office by journal voucher of labor and supplies and must agree with the Mine Cost Sheet.

MINE OFFICE, ACCOUNTING REPORTS, ACCOUNTS, ETC.

Invoices.—Invoices should be turned over to the supply clerk promptly, and should be checked by him against material received. If material checks out all right he should sign invoice on line designated for that purpose. The invoice should then be checked as to extensions and footings, discount and freight deductions, and should be signed as correct by chief clerk, and marked as to what account number should be charged. All invoices must be charged to mining supplies, and from these the items are taken through the supply book, and charged to the expense account benefited. When the invoices have been approved by

the superintendent or person authorized by him to do so the original will be forwarded to the General Office for payment accompanied by letter listing same. All signatures must be in full, initials only will not be sufficient.

At the end of the month or not later than the eighth of the succeeding month a complete list of all bills forwarded during the month past will be sent to the General Office. This list will show balance of supplies on hand at the first of each month, and amount of supplies purchased during the month, the amount consumed or disbursed during the month and balance on hand at the end of each month.

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		POTAL THE PROPERTY OF THE PROP
	·	TUTAL, CHARGE
	·	TOTAL TOTAL

Fig. 7.—Form 90.

The duplicates of invoices must be vouchered at the end of each month at each mine. Collect all bills from each firm for the month and make one voucher covering each firm's bills. The office voucher form will be used for this purpose and will credit "General Office" and charge the sundry classes of supplies for amount of invoices, without deductions for cash discounts. These vouchers should be arranged alphabetically for convenience in reference and numbered consecutively, beginning with next consecutive number from last number used during the previous month. Careful attention must be given to cash discount invoices. Such invoices must be forwarded at earliest possible date, and

in cases where material does not reach mine before expiration of discount period, invoices must be approved by superintendent in person, and he must be advised before approval of invoice, that the material has not been received, so that only such invoices will be forwarded for payment before receipt of goods as are deemed advisable by the superintendent.

Journal Entries, Miscellaneous.—Journal entries should be made on "credit vouchers" covering any transactions that may come up during the month, form 90, Fig. 7. Charge "General Office" and credit "Petty Cash," decreasing your Petty Cash for example. Entry should be made charging Petty Cash and crediting sundries, covering cash collections, and charging "General Office" and crediting "Petty Cash," covering remittance of cash collections to General Office.

An entry should be made covering collections on Pay-rolls, when they go to pay a part of the pay-roll, such as collection for supplies, commissions, etc. The entry would then be, debit Pay-roll and credit Supplies, Garnishee and collection fees, etc.

Entries should be made each month closing all accounts into General Office, except Supplies, Petty Cash, and Bank Account. These misc. entries follow the vouchers covering invoices in order of their dates, and the operating vouchers hereafter mentioned may follow the misc. entries. Continue the series of numbers from Office vouchers to Credit vouchers, so that there may be no duplicate numbers on any vouchers for the year. A new series of numbers may be commenced each year.

Record of Transactions.—All vouchers, whether Office vouchers or Credit vouchers, will be numbered numerically in "Record of Trans-

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Fig. 8.—Form 91.

actions," form 91, Fig. 8. All credits to General Office will appear in General Office column. All credits to other accounts will appear in sundry column on the left. All debits to Supplies, Mining Expense, Surface Expense, Stripping and Development, Steam production, Electric power, the different shops, Teaming and Compressor and Drills will appear in columns provided for that purpose. Debits to all other

accounts will appear in sundry column on the right. The footings only of all columns except sundries will be posted to the ledger. Each item in the sundry column whether debit or credit will be posted to the ledger separately.

The Record of Transactions will be footed and the footings of columns on debit side will equal footings of columns on credit side. No explanation of journal entries will be made in the Record of Transactions, all explanations will appear on journal entry voucher only.

Ledger.—Any account that the Record of Transactions may call for must be opened in the ledger (and may be opened to advantage in the following order): General Office, Inventory, Bank, Supplies, Petty Cash, Mining Expense, Surface Expense (Stripping and Development), Steam Production, Electric Power, Machine Shop, Carpenter Shop, Blacksmith Shop, Teaming, Compressor and Air Drills, Operating Expense, Accounts Receivable, New Construction Accounts. All accounts in the ledger will be closed into General Office account at the end of each month except Bank Account, Supplies, Petty Cash. A preliminary trial balance will be taken from the ledger before closing entries are made and a final trial balance after the closing entries are made, copies of both being forwarded to the General Office.

Vouchers, Debit and Credit to Supplies.—All vouchers having a debit or credit to Supplies must be recorded in this book, it gives a detail of the Supply Account in the ledger, and shows balance of each class of supplies that should be on hand each month.

The first entry that should be made in the record is the inventory entry, crediting inventory and charging each class of supplies with amount on hand at time books are opened. All purchases are added and on credit side supplies consumed or sold are shown under proper headings. The footings of all columns should be carried forward each month so that at the end of each month the debit footings will represent total of each class of supplies on hand when account was opened, plus supplies purchased since. The credit footings will represent the total supplies distributed to date. These footings are carried forward until the end of the year when the account is started again with inventory figures. When the total footings both debit and credit are carried forward, the balance of supplies on hand each month represented by difference between debits and credits, should be shown in red ink, and total should agree with trial balance.

Each month the warehouse clerk should secure the amount on hand of some class of supplies and should take an actual inventory of that class to determine whether or not he is developing a shortage or overrun.

In this way an excessive profit or loss at the end of the year will be avoided.

Vouchers. Charged to Mining, and Surface.—All vouchers having a charge to Mining or Surface Expense or at surface mines to Mining Expense and Stripping and Development should be entered in this book. The vouchers covering labor should be entered in succession. The vouchers covering consumption of supplies should be entered in the order outlined for making them, under caption, "Operating Vouchers;" entering the vouchers in this order facilitates securing figures for the cost sheet. To secure figures from this record for labor column on cost sheet, add together amounts charged to the different expense accounts, from labor vouchers and put footings opposite proper account on cost sheet. To secure figures for supply column on cost sheet, add together the amounts charged to the different expense accounts from supply vouchers and put results on cost sheet opposite proper accounts, forms 92, 93, Fig. 9.

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Fig. 9.—Form 93.

All columns in this record should be footed each month, balanced across with total and ruled.

Ore and Rock Statement Book.—This book gives a record of the mining tally production on day and night shifts of each grade of ore from each shaft. The pages are ruled to accommodate a grade of ore from three different shafts.

The balance on hand at the first of the year should be brought forward on line provided for that purpose and total production for the month added, giving total production for the season.

Ore Ledger.—When way bills are received from docks, they should be entered on debit side of this book under proper heading, a portion of the book being reserved for each grade of ore. When bills of lading covering cargoes cleared from docks are received, they should be entered on credit side of this ledger. The difference between debit and credit side of this ledger should equal balance of ore in the docks, as shown by the railway dock statement. The total footings should be carried forward from month to month, so that at any time the ledger will show total shipments from mines to docks and total shipments from docks to lower ports.

Stockpile Ledger.—An account should be kept with each stockpile in this record, charging it up monthly with mining tally weights put into it, and crediting it with actual weights shipped from each pile. This will show actual overrun or shortage of each pile.

Time Books.—The timekeeper should assign on his time book a page or pages for each class of employees, that is Engineers should all show in the same place on time book. In another place Firemen should be found, Surface men in another, the same plan being carried out with each class of employees. The time shown under these different headings should be classified in detail on lower part of page on which the time is shown. If there is not sufficient room on that page, the classification may be shown on the following page. The timekeeper should in this classification state exactly what the men are doing, such as "digging ditch around caved ground," "unloading timber," "unloading coal," "cleaning up stockpile bottom," etc.

The number of days at each rate in the classification should agree exactly with the number of days at each rate as shown in the time being classified.

Check-roll.—The lines on the book should be numbered consecutively, from number one to the highest number held by any employee on the time book. The names of employees are written opposite their numbers in the Check-roll. The time of each employee is transferred from time book to check-roll, thus collecting it. An employee may appear on several places on the time book, but his time will appear on only one line in the check-roll.

On the Check-roll a different mark should be used to distinguish company account time from contract time. At the end of each month the number of company account days at each rate, and the number of contract days, as extended in their proper columns, thus showing the number of company account days at each rate and total contract for each employee for the month.

The total number of company account days at each rate on the Check-roll should balance with the total number of company account days at each rate in the time book. The total number of contract days on Check-roll should balance with total number of contract days in the time book.

Contract Book.—This book is provided for the purpose of figuring the earnings of each contract and of keeping a permanent record of same. The earnings of each contract employee are transferred from this book to his account on the Pay-roll. The number of each contract should be shown on this Contract Book, and the name and number of each man working on each contract should be carried into the Contract Book, under their respective contract numbers from time books. This may be done before the end of the month in order to facilitate work at the first of each month.

The number of days worked by each man in the contract, should be placed to his credit in the contract book as soon as they can be determined on time book. The number of cars of ore or rock mined or number of feet raised, sunk or drifted by each contract with rate per car or foot, should be turned in by the Mining Captain and placed to the credit of the contract.

The Warehouse Clerk will report supplies chargeable to each contract. The net earnings of each contract will then be determined by extending cars or feet mined at the different rates and deducting from these gross earnings the supplies and labor cost chargeable to the contract. The net earnings are divided by the number of days worked in the contract to determine the rate per day and each man in the contract receives his portion of the net earnings of the contract according to the number of days he worked. The amount distributed to the men in each contract must agree exactly with the net earnings of the contract.

It is understood that when a contract has to pay its trammers or other labor, the trammers or laborers do not receive any share in the contract, but are carried and paid as company account labor, and the total of this company account labor performed for each contract is charged up to the respective contracts as a labor cost to the contract. A provision for this charge to the contract is made on "Summary" in Contract Book.

Pay-roll.—Time of each employee is transferred directly from the Check-roll to the Pay-roll, the company account column on the Pay-roll showing number of company account days worked by each man at each rate, while the contract column will show total contract days worked by each man. The contract rates need not be shown on the Pay-roll. The company account time is then extended on Pay-roll. The contract earnings of each employee are collected from contract book and placed on Pay-roll to his credit as a total. The deductions for Doctor, Aid Fund, etc., are then made and Pay-roll footed and balanced. The footings on each page are not carried forward but are summarized at the end of Pay-roll for the month.

When settlements with employees are made during the month, their account should be spread on Pay-roll, and under no condition shall a due bill or check be made in favor of an employee from any other source than Pay-roll book.

Pay-rolls should be footed, balanced and summarized before journal vouchers are made out for the month.

Labor Classification.—The classification of labor shown on the Time books, as outlined above, is copied into Labor Classification book. The company account time is extended on this book and should balance with footing of company account column in summary of Pay-roll. The contract earnings are carried into Labor Classification book from Contract book and the total contract earnings shown on labor classification should balance with contract column in summary of Pay-roll. The total of labor classification should equal gross amount of Pay-roll.

In transferring classification from Time book and Contract book, into Labor Classification book, care should be taken to get all of each class of labor under its heading. That is, have all Surface labor listed on the Labor Classification together rather than have it appear in several different places. The same applies to "Drifting in Ore," "Drifting in Rock," etc. This will greatly facilitate making journal entries from labor classification.

The Shop and Team labor is kept on Time book but is it not usually classified in Time book. The foremen of Shops and Teams make daily reports covering labor performance in their departments each day. These daily reports are entered daily in Shop labor book, which gives a much better classification of labor than could be obtained on Time book.

When all Shop and Team reports have been entered in the Shop labor book, the total number of hours on that book should agree with total number of hours shown on Labor Classification book worked by Shops and Teams. The total labor cost of each shop should be taken from each labor classification, and dividing these amounts by the number of hours worked in the respective shops, will give the rate per hour from each shop. The extensions should then be made on Shop and Team labor book. The total of these extensions for each shop should, of course, balance with the labor cost of each shop taken from the Labor Classification.

Record of Supplies Used.—This book is provided for the purpose of keeping accurate record of each class of supplies used for each class of labor performed. Several pages in the book are set apart for each of the operating, shop and Improvements accounts, and such others as may be found necessary. The following are some of the accounts which will be opened, Steam Production, Machine Shop, Blacksmith Shop, Carpenter Shop, Compressor and Air Drills, etc. (Fig. 10, Form 2).

Supplies are issued only on an order from the Superintendent or persons duly authorized by him, and each order for supplies should state for what purpose the supplies are to be used, that is exactly on what piece of work they will be used. The Warehouse Clerk will enter these orders in the Record of Supplies Used, under the account designated by the statement on the order showing for what the supplies were used. He will list each item and extend the amount into the proper column, that is if the item is a tool, the amount should be extended into the tool

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Fig. 10.—Form 2.

column, etc. When all supplies used for the month have been entered, the columns should be footed and balanced across with the total column. A summary is then drawn off which will show the total of each class of supplies, and the total of all classes of supplies consumed on account of each and all classes of labor performed. There should be absolutely no supplies disbursed which do not show on the Record of Supplies Used.

Reports to General Office.—As soon as Pay-roll, Labor classifications and Supply summaries are completed and balanced, entries should be

No. ACCOUNTS PAYABLE VOUCHER PAY ROLL VOUCHER For Labor Performed at Mine	Ollyer Iron Mining Co.	TOTALS	Mining Labor						Total, Due,	PaldChack
				dger at the Mine Company.		Buperintendent.	AUDITOR.	AINING COMPANY, DOLLARS,	noo Pay Roll Account.	
PANY. To SUNDRY EMPLOYES, DR.	Mine of this 19 , as shown in detail Less Sundry Credits,	Net Amount,	Balance Payable,	formed, as shown by Time Books, Pay Rolls and Le al Books of and for psyment by Oliver Iron Mining (Approved:	K. Entered:	11	. 19 of OLIVER IRON MINING COMPANY,		
OLIVER IRON MINING COMPANY. BEXORANDE BUILDING, DULUTH, MINN. T	For Personal Services randered at the Company during the month of by the Records at the Mine Office.	Less Advances BV#		The above figures are amounts earned and due for labor performed, as shown by Time Books, Pay Rolls and Ledger at the Mine Office, and are correct; the net amount for entry on the General Books of and for payment by Oliver Iron Mining Company.	Correct:	Approved for payment:	FOR PRESIDENT.	RECEIVED.	To be deposited to Credit of	

Frg. 11.—FORM 119.

made on vouchers provided by the General Office for that purpose. The first entry will be an Accounts Payable voucher (form 119, Fig. 11), covering net amounts of Pay-roll, that is amount for which checks will be drawn. This entry will show gross amount of Pay-roll, less Pay-roll collections for which no checks will be drawn, and the net amount of payment. This latter amount should show on back of voucher opposite the Mining Labor account number of the respective mines.

The second entry (form 113, Fig. 12) will cover the amount of Payroll collections shown on the above entry, and will be a charge to "Mining

			NING COMPA	NY.	
	DEBIT MINING LABOR.		CREDIT SUN PAY ROLL COLL		
19	For Collections made on Pay during month of deducted on Accounts Payable same month. Tenement Rentals, Machinery Rentals, Cash Sales, Labor Supplies,	OLIVER OUTH OUTH TOU PAY Entered Journal Foli	Mine this amount having been rering Mining Labor for (Reverse Side) R IRON MINING CO. RNAL VOUCHER OF ROLL COLLECTIONS. No		
Correct,	See Accounts Payable Vouche				
Approved,	CHIEF CLERK.	Mine during	amounts represent deducti month of ks of OLIVER IRON MIN	19, and is o	orrect for entry on
	AUDITOR.			8	uperintendent.

Fig. 12.—Form 113.

Labor," and a credit to "Rentals," "Supplies," Garnishee and Collection Fees, Cash, Sales, or such other items as may be found necessary. The charges to mining labor on Form 113-9, Figs. 11 and 12, should equal gross amount of Pay-roll and should be checked against total of Labor Classification before being forwarded.

The third entry will be a credit to Mining Labor and a charge to Direct Expense, Operating, General Repairs, Supplies, New Construction, and so on as per form 116, Fig. 13. The credit to Mining Labor on this form should equal charges to Mining Labor on the preceding forms.

The fourth entry will be a credit to Mining Supplies charge to Direct Expense, Operating, General Repairs, New Construction, etc., as per form 115, Fig. 14. This voucher should cover total of all supplies disbursed during the month with the exception of supplies collected for on Pay-roll, which will appear on form 113, Fig. 12. This voucher should be made from Summary of Supplies Used, furnished by the Warehouse Clerk.

For Mining Labor employed for the various accounts shown below at during month of Direct Expense, Operating, General Repaire, Total Operating, Mining Supplies, New Construction, Improvements, Miscellaneous Profit and Loss, Accounts Receivable, DUIVER IRON MINING CO. JOURNAL VOUCHER OF MINING LABOR. Entered Jeurnal Follo. Profit of Mining Labor, Total Credit to Mining Labor, The above is a summary of Mining Labor and for what account such Labor was performed at. Mine, during month of. 19 CHIEF CLEEK. Approved, OHIEF CLEEK.		ON MINING CO AL ENTRY VOUCE		ABOR.
Operating, General Repairs, Total Operating, Mining Supplies, New Construction, Improvements, Miscellaneous Profit and Loss, Accounts Receivable, OLIVER IRON MINING CO. JOURNAL VOUCHER OF MINING LABOR. Entered Journal Folio. 19 EDONKHEPPE Total Credit to Mining Labor, The above is a summary of Mining Labor and for what account such Labor was performed at. Mine, during month of. 19 as shown by Pay Roll Record and Time Books in the Mine Office, and is Approved,	, ,		w at	Mine,
The above is a summary of Mining Labor and for what account such Labor was performed atMine, during month of	Operating, General Repairs, Total Operating, Mining Supplies, New Construction, Improvements, Miscellaneous Profit and Loss,	OLIVER IRON MININ JOURNAL VOUCHE OF MINING LABOR. Entered Journal Folia. BOOR	G CO. R	
was performed atMine, during month of19 as shown by Pay RollRecord and Time Books in the Mine Office, and isApproved,		Total Credit to Mining	Labor,	
SUPPRINTENDENT. AUDITOR.	was performed atMline, during mo as shown by Pay RollRecord and Time Books in	onth of		

Fig. 13.—Form 116.

The fifth entry will cover estimated Taxes and Insurance for the month as per form 114. Insurance will be separated to show amount chargeable on Mine buildings and amount chargeable to Dwellings rented or to be rented. Insurance on superintendent's residence or such dwellings as are furnished employees without rent should be charged to Mine buildings; the total Insurance on Mine buildings only will be shown on Mine Cost Sheet.

The sixth entry will be made on form 120, covering cash collections for the month. The entry will be charge Cash Sales and credit Garnishee and Collection Fees, Rentals, Accounts Receivable, etc. This entry should credit all items sold for cash except supplies which will receive credit on

form 115, Fig. 14. Where the collections are too numerous to show details on the voucher, a statement giving details should be attached to the voucher. All cash collections should be remitted to the General Office at the end of each month, with a letter stating that the cash should be credited to Cash Sales.

General.—In addition to the above vouchers there will be the monthly Ore Reports, Analysis of Direct Expense, form 127, Fig. 15, New Construction, Misc. Profit and Loss (form 202, Fig. 16), Improvements.

OLIVER IRON JOURNAL	MINING CO		
DEBIT SUNDRY ACCOUNTS.		CREDIT MINING LAS	BOR
For Mining Supplies consumed at as shown in detail by the records in the Mine Off		pany, during month of	19
Direct Expense, Operating, General Repairs, Total Operating, New Construction, Improvements, Miscelleneous Profit and Loss, Accounts Receivable, Cash Sales	OLIVER IRON MII JOURNAL VOU OF MINING SUPPLIE Ratered Journal Folio	CHER S USED. No. 19 BOOKKEPER	
The above is a summary of Mining Supplies consume during month of		Correct,	
Used Book and Ledger, and is correct for entry on Oliver Iron Mining Company.	General Books of	Approved,	CHIEF CLERK.
	SUPERINTENDENT.		AUDITOR.

Fig. 14.—FORM 115.

The General Office will also require a copy of the Mine Cost Sheet at the earliest possible date.

If there are any charges out of the ordinary on any entry coming from mines to General Office, such as charges to Idle Mines Supplies, Profit and Loss, a new exploration, etc., details should be given to enable the General Office to handle the charge promptly without writing the mine for particulars.

Vouchers—Operating (Mine Books).—As soon as General Office entries and reports are forwarded work on Mine Cost Sheet should be commenced. First make a journal entry on credit voucher charging

	SIS FOR MONTH AND SEASON END								19
ACCOUNT No.	ACCOUNT	AM	OCN1		TOTAL FOR MONTH	Ī	TVI OI NAIR	AL B IOM	REMA
1.	Salaries (Supt. and Office force)			П	TIT	Т		Ш	
2.	Rents	П			111	T	Ш	$\top \top \top$	
	a. Offices					T	Ш		
	b. Warehouses				+	T	Ш	711	
	c. Real Estate and Royalty			П		1			
3.	Stationery and Printing					T	П	111	
4.	Telephone and Telegraphing		11				Ш		
	a. Telephone Rental			П	$\Pi\Pi$	Т	П		
	b. Telegraph Rental								
	c. Telegrams								
	d. Salaries (Opp. and Messengers)					T			
	e. Toll Service and Sundries				$\top \sqcap$	T	П		
5,	Traveling Expense					T		$\top \top 1$	
6.	Office Expense					T			
	a. Postage			П					
	b. Petty Expenses	\Box					\Box	$\Box\Box$	
	c. Lunches	\Box		П		Т			
	d. Payments to Banks	\Box			TTT	Т	77		
	e. Repairs			П	$\Pi\Pi$		П	\Box	
7.	Special Expense					Т	П		
	a. Special Service			П	TH	Г	\top		
	b. Special Expense, Officers			П	$\Box \Box$	П	П		
	c. Premium Surety Bonds	77				П			
\neg	d. Patents	$\neg \neg$	Π	П	\Box	П	\Box		
8.	Legal Expense	\top		\Box	111	П			
9.	Analysis	TI	Π		111		П		
10	Prospecting	$\exists \exists$		П	$\Pi\Pi$	П	П		
11.	Revenue Stamps	$\exists \exists$			\Box	П	П		
12.	Experimental Work				$\Box \Box$	П			
13.	Office Fixtures	77		П		П		\top	
	a. Sundries					П			
	b. Repairs							$\top \top$	
14.	Commissions	П			TIT	П	П		
			oxdot	ロ	Ш		므	-	
-		+	$+\Box$	\exists	FHF	F	H	++	
		+	+	\vdash	++-	+	++	╅┼╂	
	Total for Month, Total for Season	-++	+	\vdash	+++	H	+	++1	

Fig. 15.—Form 127.

the sundry Mining and Surface Expenses, Accounts Receivable, etc., and crediting Pay-roll with the gross amount of Pay-roll. This entry should be made from Labor Classification book.

Second, credit on credit voucher, Steam Production and charge the different Shops, Mining and Surface expenses, effected with amount charged to Steam Production. This entry should be made from information secured from Master Mechanic, or some one fully conversant with portion of steam consumed by Pumps, Hoists, etc.

during month of Construction, Loss, as shown	charges at	190, to new aneous Profit and
CCOUNT NO.	DESCRIPTION	AMOUNT

Fig. 16.—Form 202.

Third, credit on credit voucher, the different Shops, Mining and Surface expenses, etc., as per classification on the Shop Labor books, Steam Production charge, Labor performed by Air Drills, and Power furnished by Electric plant. This entry will balance our charges to Shops, Teaming, etc. The above entry distributes all labor performed during the month.

Fourth, make a journal entry on credit voucher, charging sundry Mining and Surface Expense accounts, etc., and crediting Supplies under the different classes, with Supplies consumed, except amount of supplies sold and collected for on the Pay-Roll. This entry will be made from Summary of Supplies Used.

Fifth, credit on credit voucher, Steam Production, and charge the different accounts benefited with the amount of Supplies charged to Steam Production during the month. This should be done from information furnished by the Master Mechanic or some one fully conversant with portion of steam consumed by Pumps, Hoists, etc.

Sixth, credit on credit voucher the different Shops, etc., and charge Mining and Surface expenses, etc., with supplies and Steam Production used by shops, etc. This charge to sundry Mining and Surface expenses should be made in the same proportion as shops, etc., was charged to the Mining and Surface expenses. In other words, determine the percentage that the total supplies used by shops bear to total labor performed by shops. Taking this percentage of shop labor charged to each class of Mining and Surface expense, will give the charge to each class of Mining and Surface expenses for Shop supplies. These entries distribute to costs all supplies consumed on account of operations during the month. These labor and supply entries should be now entered in Record of Vouchers, charged to Mining and Surface Expenses or if the Mine is a Surface Mine, in the corresponding Surface Mine book. From this book figures for Cost Sheet can now be taken.

Cost Sheets.—The figures for labor and supplies required for Mine Cost Sheet, form 49, Fig. 17, may now be taken from the Record of Vouchers charged to Mining and Surface Expenses or Mining and Stripping and Development in case of Surface Mines.

These figures should be placed on cost sheet opposite the proper account and a total of labor and supply columns on Cost sheet should agree with total charges to Mining and Surface Expenses, on Record of Vouchers charged to Mining and Surface Expenses, with the exception of the amount of Taxes and Insurance which is shown on the cost sheet, as a memo. only.

Dividing the different amounts now shown on the cost sheet by the production will give the cost per ton for the different expense accounts.

While Taxes and Insurance are shown on the cost sheet as a memo. only, a cost per ton should be determined and shown; all costs per ton should be figured to three decimal places.

The summary of production should show amount on hand at first of each year, and total of each grade produced for the month, previous months, and season, tonnage shipped, overruns and balance in stock at end of the month.

The summary of supplies may be obtained for the month from summary reported by the Warehouse Clerk, and the total should balance with supply column, in body of the cost sheet for the month and season,

EXPENSE ACCOUNTS, Labor MINISTERSES, MINISTE	Month	For Previous Moseller	Mantha	AND DESCRIPTION OF PERSONS
	Ceer Rupples Coan Let Unit	Labor Con Supplies Con Realist	Labor Cop 1 Supplies	SHAPTS PRODUCTION STATMENT TONGORD MINED
MINING EXCENSE. D. Derligment in Sect. Chapter in The Control of Sect.				
1. Development in Nort. L. Development in Nort. State of the North Control of the North Contr				
Tables and Shortes Book				
CEntaming by Passer				
207 Cage and Little Teachers. 200 Pamping. 200 Underground Tracks.				Predged on Malng Tally
12. State See and Dissabilities. 12. Dry and Chenge Region. 13. Mark Emberden. 14. George House See and See and See Good See and See See See See See See See See See Se				And Overcus Take Evaluation Shydnesis Islance in Singh
				Grandfamilia of Con all Supplies Con Deal Supplies Con Sea Supplies of Supplies Supp
Kutal Mala & Espenda.				in Erpostrea.
SURFACE EXPERSE.				John Delli Steel 150 Lean and Steel 100 Leanner,
223 Shooking and Sociase Ore,				M. Mining Mather, 100 Tours Parking and Waste 100 Steam Parking and Waste
27 Leading Stockeder (by head) 38 Striping.				110 Gas Elpe and Fixtops 111 Shoungail Water Has
DE British Tracks				113 Start Ball Ball Ball Ball Ball Ball Ball Bal
124 Office direct expense,				112 North Destings 112 North Reps. 117 Carbine, Damont Dell
Carried An artes General Sarfese Expense				118 Meanin Rope. 120 Chemicals. 120 Full
				12. Service. 12. Belle. Service. Washers 12. Belle. Service. Washers
Total Surface Expense, Total Mine Ogta				12. Brown Word Perin 12. Brown we Printing 14. Manilance
ADMINISTRATIVE EXPENSE				A PER AGE WATER OF ALL CAROLI
Taber				Courted Mosts Transmitter Tran
TOTAL OBT for Mosts and Year, Quel Phil TON for Mosts and Vanc. Avrage Nather Employed.				
Atterage Wagne Paid.				

Fig. 17.—FORM 49.

GLASSIFICATION	NO.	FOR TOWN OF SER	BONTE	No.	FOR PREVIOUS MONTHS	MONTES	H	10,0		MONTH			
OF LABOR	No. Der	1	L De Co	1	Co Eartha		1	A PART	Total Baralega	1 to 1	T 2	REMARES	
Stating Stafe Contract													
riching Winger Contract		į	1	į			#	į	#	Ŧ			
toping Co. Ace't.		ŀ											
minding On Low L.		L							i E	Ī			
Ace and Ally Tenders													
der ground Truck men													
seral Underground Labor													
Die Deser								ļ	‡				
echinists													
setton the	1									İ			
Januar													
Tank I	1	-	‡ ‡		#		#		Ī	Ĭ 			
imber Cuttern	E												
ecking and Bording Ore													
Out to	1	Ī											
Mining Engrover and Assistant													
rebouse Carlis	±									1			
eral Surface Labor													
m labor	1		#							1			
GRAND TOTAL, PER DAY,		į			Į				į				
											- C. C. C. C.		
			ପ୍ରି	TRACI	LABO	R STA	TEMEN	T AN) REST	HIS P	contract labor statement and results per man per day	×	
CLABSIFICATION OF LABOR	No. Days	Total	MONTH No. Dark		PREVIOUS de Rerais	Post Services NonTess of Services No. 100 No.	2 2 3	200	Teast Earthag	AS CALL	MONTHS FOR MANAGEMENT OF THE PART PARTY OF PARTY OF PARTY OF PARTY OF PARTY OF THE	POR PREVIOUS MONTES POR	Town of Or P. Man p. De
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aling Winses, Gentrad,													
Add Cost of Susmilled	Ī	Ī	#						-				
Allactics had been a													
Add Cent of Buggilles													
Add Company Acr's Labor													
Add Cost of Buggillos													
saming, Gestrack,													
Add Company Acr't Labor					1			Ī	Ŧ Ŧ				
ORAND TOTAL													

Fig. 18.—FORM 50.

before Taxes and Insurance are added. The cost per ton is obtained by dividing the amount of different classes of supplies by the production, and the cost per ton should be figured to three decimal places. Total of labor and supply columns and amount of Taxes and Insurance and Direct Expense on Cost Sheet should be checked carefully with figures reported to General Office on monthly journal vouchers.

Labor Sheets.—Form 50, Fig. 18. The number of days and earnings of each class of employees for the statement must be secured from Labor Classification. Divide the number of days worked by actual working days in the month as shown in list furnished by the Auditor, to obtain the number of men for the month. The number of men should be figured to one decimal place. The rate per day is obtained by dividing earnings of each class of labor by the actual number of days worked by the respective classes of labor. Cost per ton is obtained by dividing earnings by production. The number of days on the labor sheet should agree with the total days shown on Pay-roll, and the total earnings should agree with gross amount of Pay-roll. The contract and company account days and earnings for lower part of the labor statement as well as the number of feet of Drifts, Shafts, Raises or Winzes, may be obtained from Labor Classification. The supplies are reported by the Warehouse Clerk and should agree with supplies on the Cost Sheet. The total hoist of ore and rock usually represents the tons trammed. The difference between the total tons of ore produced and the number of tons obtained from development work, gives the number of tons stoped. Obtain the number of men and rate per day by same method used in upper portion of the statement. Determine the cost per foot of shafts, raises or winzes and drifts, by dividing sum of earnings, company account and contract and the supplies. by the number of feet of Shafts, Raises, Winzes and Drifts. The cost per ton for Stoping and Tramming is obtained by dividing the sum of earnings of trammers and the supplies used, by number of tons stoped or trammed.

Feet and tons per man per day are obtained by dividing feet Sunk, Drifted, or Raised, etc., by the number of days worked on each, and the tons stoped or trammed by same method.

The difference between earnings on Labor Sheet and labor on Cost Sheet should be explained by supplementary statement under "Remarks Column," something as follows:

> Total Labor as per Cost Sheet Add Labor charged Construction Add Labor charged Supplies Add Labor charged Accounts Receivable Add Labor charged, etc. Total Labor as per Labor Statement.

CHAPTER II

MINING AND MILLING NATIVE COPPER

ACCOUNTING METHODS OF THE OJIBWAY MINING COMPANY

In the Lake Superior Copper District, copper is found in its native state, distributed through the vein rock. These copper bearing veins vary from 14 ft. to 60 ft. or more in width, and have a dip, varying from 26 degrees to 80 degrees from the horizontal.

The development of these copper deposits is usually by means of inclined shafts, which are either sunk in the vein itself, or in the footwall at distances varying from 30 ft. to 100 ft. parallel to the vein; as depth is attained drifts are run to the vein at from 100 ft. to 200 ft. apart, and when the mine is sufficiently opened up to begin production, stopes are started in the drifts at regular intervals.

The vein rock after being broken down in the stopes by air drills is sorted by hand, about 40 per cent. being discarded and used to fill worked out stopes. The good rock is loaded into cars by hand and trammed to the shaft, dumped into the skip and hoisted to the Rock House at surface. The skips dump automatically, the rock running over grizzlies; the coarse rock is crushed in Blake type crushers for shipment to the mill. The railroad tracks run directly under the rock house so that the rock can be loaded into the cars by gravity for shipment to the mill in train loads.

At the mill the trains enter directly over the storage bins and dump their loads. The rock is fed to steam stamps by gravity, and is crushed to sand; this sand passes over screens, jigs, rolls and concentrating tables. The copper is separated from the rock by gravity, with the aid of water. The resulting concentrates which run from 30 per cent. to 90

HEAD OFFICE LEDGER ACCOUNTS

per cent. copper are sent to the smelter for treatment.

Capital Stock (paid in).—To this account is credited the amount of the Capital Stock of the company (paid in). The debit for this journal entry is to "Subscription." As assessments are paid the amount of the Capital Stock account is increased by the amount of the assessment called.

Vouchers Payable.—To this account we credit the footing of the Voucher Record for the month. We debit this account with all vouchers paid, as per footing of the Cash Book for the month in question,

THE COST OF COPPER TO CONSUMERS

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980
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Administration Office General	Smelting Freight Sell—commission	Earnings	Operating Construction	Freight Sell—commission Administration	Copper at Smelter	Profit on Sales
Legal Postage and Stationery				Transportation Mineral Mass	Mineral at Mill	Smelting Operation Maintenance
Discount		-		Transportation Rock	Ore at Mines	Stamping Operation Maintenance
		Mining	Development	Surface	Office	Incidentals
		Miners	Miners	Highways	Mine	Taxes
		Supplies	Supplies	Clear land	Purchasing	Insurance
		Power drills	Power drills	Fire protection		Depreciation
		Compressor	Compressor	Rents		Traveling
		Air lines	Air lines	Water supply		Telegrams
		Tramming	Tramming	Electric light		Periodicals
		Tram cars	Tram cars	General surface	•	
		U. G. tracks Timbering	U. G. tracks Timbering			
		Pumping	Pumping			
		General U. G.	General U. G.			
		Hoisting Rock house	Hoisting Rock house			

Norg.—Debit accounts are underlined and the items below it are either sub-accounts or direct charges of it. The word consumer refers to the manufacturer.

HEAD OFFICE LEDGER ACCOUNTS

General accounts	Sub-accounts
Capital Stock (paid in) Vouchers Payable Subscription Assessments Mining Property Furniture and fixtures Cash Notes Receivable Accounts Receivable Mine Agent Loss and Gain Copper (sales)	·
Construction Operating Account	Mining Expense Development Transportation Stamping Surface Office Incidentals
General Expense	Office Expense General Expense Salaries Legal Postage and Stationery Smelting and Selling and Freight Interest, Discount, etc.

Subscription.—When the corporation was organized the amount of Capital stock offered for public subscription was credited to the Capital Stock account for the amount paid in, which was the subscription price; this account was charged with that amount and as the subscriptions were paid, either in cash or notes, this account is credited and closes. In the event of another issue of stock the account would be opened.

Assessments.—This account is charged with the full amount of Assessments as called, the credit being to the Capital Stock Account (increasing the paid up value). As assessments are paid the Assessment Account will receive credit for the amounts until all are paid when the account closes. A separate account is kept with each assessment.

Mining Property.—To this account is charged the original cost of the mining property, also the cost of additional lands that may be purchased from time to time.

Furniture and Fixtures.—To this account is charged all office furniture and fixtures, typewriters, adding and calculating machines, etc.

Cash Account.—This account shows the receipts and disbursements of cash each month as per cash book.

Notes Receivable.—To this account is charged the face value of all notes received in exchange for Stock, Cash, Copper or property. As the notes are taken up this account will receive credit.

Accounts Receivable.—This account shows the amount due the company from the sale of copper, property, etc. Separate accounts are kept with each corporation or individual.

Mine Agent.—To this account is charged all funds furnished the Mine Agent to carry on operations at the property. The account receives credit each month for the following charges, as per report furnished by the Mine Agent.

Dr. Construction Account
Dr. Operating Expenses

The difference between the debits and credits of this account is represented by:

Cash Supplies
Fuel Accounts Receivable
Less Accounts Payable

The above as shown by trial balance of mine books.

Loss and Gain.—The following accounts are closed into this account each month by journal entry.

Copper Operating Expense
Construction General Expense

Copper.—This account is credited with all sales of copper.

Construction.—This account is charged with all construction items as per Mine Agent's report each month. Credit Mine Agent.

Operating Expense.—This account is charged with all operating expenses each month as per Mine Agent's report. This account comprises the following accounts:

Mining ExpenseSurface ExpenseDevelopmentOffice ExpenseTransportationIncidental ExpenseStampingCredit Mine Agent

General Expense.—This account is composed of the following sub-accounts:

Office Expense.—Rent, heat, light, janitor, etc.

Postage and Stationery.—Stamps, stationery, printed matter, and misc. office supplies.

Legal Expenses.—

Salaries.—Corporation officers, general manager, office clerks.

General.—Directors' fees, traveling expenses, corporation expenses, telegrams and subscriptions.

Smelting and Selling.—

Interest and Discount.-

All salaries and invoices are paid by check; the voucher system is used, a voucher being made out and the amounts entered in the Voucher Record to the proper account.

In the Annual Report furnished to stockholders a financial statement appears, of which the following is an example.

FINANCIAL STATEMENT

TRIAL BALANCE APRIL 30, 1910

Capital Stock (paid in)Vouchers Payable		\$924,000.00 10,247.13
Mining Property		20,221120
Accounts Receivable	18,406.81	
Cash	44,330.18	
Supplies	15,320.26	
Loss and Gain	396,270.59	
	934,247.13	934,247.13
CURRENT ASSETS AND	Liabiliti es	
A s s e t s		
Accounts Receivable	18,406.81	
Cash	44,330.18	
Supplies	15,320.26	
-	78,057.25	
Liabilities		
Vouchers Payable	10,247.13	
Assets in excess of liabilities	\$67,810.12	-
RECEIPTS AND EXPE	NDITURES	
Receipts		
Cash on hand May 1, 1909		38,437.58
Calls paid	66,744.00	
Interest	2,370.54	
Bills Receivable	64,230.00	

133,344 . 54

Expenditure	8		
Mining Property	24,000 .0	n	
Operating Expenses.			
Construction			
Office, General, Legal,	Salaries 5,401.6	0	
		- 132,653.28	
Less			
Increase in Vaucham	Daviable 2.714.9	0	
Increase in Vouchers		_	
Decrease in Supplies.		13	
Decrease in Accoun			
able	129.5	3	•
		- 5,201.34	
			127,451.94
			
Cash on hand April 3	0, 1910		\$ 44,330.18
	MINE ACCOUNTS-M	INE BOOKS	
		SIDE LEDGER	
General Ledger	*	1	
Controlling Accounts	Sub-accounts	Closed Accounts	Shop Accounts
COLUMN TOO CALL		0.0004 110004110	Shop Heodulus
		·	
I. General Expenditures	A separate account for	o-10. Steam Plant	o-1. Teaming
1	each	o-12. Elect. Lt. and	
į	Building	Power .	o-3. Machinists
	Equipt. of each plant	0-13. Compressor	0-4. Blacksmiths
\	Water lines Sewer lines	0-14. Power Drills	o-5. Electricians
2. Construction	Air lines—Surface	0-15. Air lines 0-16. Tramming	o-6. Eng. Dept. o-7. Masons
2. Construction	Electric lines	0-17. U. G. Tracks	0-7. masous
1	Dame	0-18. U. G. Cars	
į	Railroad	o-19. Pumping	
	Trestles	0-20. Timbering	
	Port. Machy. and	0-21. Gen. U. G. Ex-	
Į.	Equipt.	pense	(Stamp Mill)
(A separate account for	0-22. Hoisting	o-55. Surface
Į.	Sinking each Shaft	0-23. Rockhouse	o-56. Teaming
l l	Construction ditto Plats each shaft	0-24. Water Supply 0-25. Heating System	o-57. Carpenters o-58. Machinists
	Each Cross-cut	0-25. Reating System 0-26. Co. Team a/c	0-50. Blacksmiths
3. Development	Each Raise	0-27. Clearing Land	o-60. Electricians
	Each Winse	0-29. Highways	o-61. Masons
}	Each Drift	0-29. Rents	
İ	Diamond Drilling		
Į.	Surface Exploring		
4. Mining Expense	A separate account for		
	each stope	(Stamp Mill) 0-40. Steam Plant	
5. Transportation	6-r. Head No. 1	0-41. Pumping	
6. Stamping	6-2. Head No. 2	0-42. El. Lt. and Power	
7. Surface Expense		0-43. Rolls	
8. Office Expense	8-r. Purchase Office	0-44. Regrinding	
	8-2. Mine Office	0-45. Screens and Elevs	itors
9. Incidentals 0. Cash		o-46. Jigs o-47. Tables and Vanne	·re
I. Treasurer		0-48. Conveyor	
2. Bills Audited		0-49. Laboratory	
3. Sundry Labor		o-so. Wash Account	
4. Taxes		o-51. General Expense	
5. Insurance		0-52. Rents	
6. Aid Fund	1		

MINE ACCOUNTS-MINE BOOKS-Concluded

General Ledger		SIDE LEDGER	
Controlling Accounts	Sub-accounts	Closed Accounts	Shop Account
7. Supplies	17-1. General 17-2. Iron and Steel 17-3. Explosives 17-4. Cement, etc. 17-5. Lumber, etc. 17-6. Machinery 17-7. Pipe and Fitts. 17-8. Oils and Grease 17-9. Electric 17-10. Tools 17-11. Mill 18-1. Soft Coal		
8. Fuel	18-2. Hard Coal 18-3. Bloss Coal 18-4. Coke 18-5. Family Wood 18-6. Boiler Wood 18-7. Mill		
9. Accounts Receivable	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
o. Deferred Accounts	20-1. Loss and Gain on 20-2. Manufacturing Su 20-3. Hoisting Ropes		

GENERAL LEDGER ACCOUNTS

- 1. General Expenditures.—The following general ledger accounts are closed into this account each month by journal entry.
 - 3. Development
- 7. Surface Expense
- 4. Mining Expense
- 8. Office Expense
- 5. Transportation
- 9. Incidentals

- 6. Stamping
- 2. Construction.—This account comprises all Construction subaccounts in the side ledger. The construction schedule calls for a separate account for each Building.
 - B. Equipt. of each plant
- F. Dams
- C. Water lines
- G. Railroads
- D. Sewer lines
- E. Air lines on surface
- H. Coal trestles I. Portable machinery and equipt., etc.
- See construction side ledger accounts for details.
- 3. Development.—This account comprises all Development subaccounts in the side ledger. The Development schedule calls for separate accounts as follows:

- A. Sinking each shaft

 R. Construction of each
- B. Construction of each shaft (Timbering, tracks, piping, etc.)
- C. Plats, each shaft D. Each crosscut
- E. Each raise
- F. Each winze
- G. Each drift
- H. Diamond drilling
- I. Surface exploration

See side ledger accounts for details.

- 4. Mining Expense.—This account comprises all Stoping accounts in the side ledger. A separate account is kept with each stope.
- 5. Transportation.—To this account will be charged the following items:

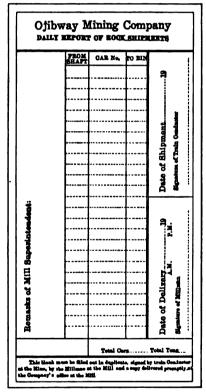


Fig. 19.—Form 25.

Freight on rock to stamp mill Freight on mass copper to smelter Freight on mineral to smelter Labor loading rock cars Labor loading mass copper Repairs to mineral cars

8

The Surface foreman will superintend the loading of Rock cars, and as Rock trains are made up for shipment to the mill he will make out a list in duplicate, on form 25, Fig. 19, showing the car numbers and the shaft they come from, also date and time of day noted. The train conductor will sign this report in duplicate; the original goes to the Mine Clerk; the duplicate will be delivered to the Mill Superintendent or some one authorized by him to receive it. In the event of a car being set out of the train for any reason between the mine and the mill, the conductor will note same on the report; this enables the mine and mill to keep accurate track of shipments.

These train reports are tabulated in a book, ruled for the purpose, form 23, Fig. 20, segregating the shipments from each shaft each day. Car numbers only will be shown. Each car is rated at 41 tons capacity.

		1111	MEN		1810	<u> </u>	· · · · · · · · · · · · · · · · · · ·				18
Date	1	2	3	4	5	6	7	8	etc.	Total	Tons
Shaft											
No.1											
Total			<u>. </u>								
Shaft											
No. 2											
Total											
Total Cars											

Fig. 20.—Form 23.

This will give a complete record of shipments to the Mill. The Rock shipped Train Reports are the basis on which settlement is made with the railroad for freight charges.

Mass copper is shipped in car loads to the smelter direct from the mine. If a track scale is convenient the empty car will be weighed before and after loading, if not the mass will be weighed on a portable

scale as loaded. This will be done under the supervision of the Surface foreman who will report weight of car to the Mine Clerk. Mass shipments are entered in the "Mineral and Mass Shipments" record as mentioned below.

Mineral is shipped from the mill to the smelter in special steel hopper cars. For the convenience of the smelter, grades 1, 2, 3, 4 will be shipped together and Headings and Barrel work together. A report covering each car of Mineral shipped is made out in triplicate, in the following form, form 34, Fig. 21. Copy to the Smelter, Mine Clerk and one retained at Mill.

Gentlemen: Car No your works on	conta	Date	
No. Barrels	Grade	Net Mine Weight	
	Total as per last report		
	H. Stamps		
	No. 1 "		
	" 2 "		
	" 3 "		
	" 4 "		
	Barrel Work		
	Mass Copper		
	Total		
		ours truty,	

Fig. 21.—Form 34.

These reports of mineral shipped will be entered in the record of "Mineral and Mass Copper Shipped," form 29, Fig. 22. For this purpose a book ruled as per the following illustration will best serve the purpose.

6. Stamping.—This account comprises the sub-accounts in the side ledger with each Stamp Head.

Date Initia	ls Number	Mass.	Hds.						_
	14 diliper		II.Us.	Brl. Wk.	1	2	3	4	Tota
1	i	i i		i	<u> </u>	İ	i	<u> </u>	i
2									
8									
30 31				-	<u> </u>	<u> </u>		 	
31	!		<u> </u>	!	<u> </u>	<u> </u>	!	!	<u> </u>

Fig. 22.—Form 29.

7. Surface Expense.—Charge to this account:

All Surface labor as per time book Supplies as per supply book

Water supply, proportion Elect. light and power, proportion Highways Clearing land Fire protection Rents, balance for the month Closed off each month on a basis of labor performed to the various accounts benefited.

These items constitute Surface Expense together with any charges which may come from the Surface account.

- 8. Office Expense.—This account comprises the following subaccounts in the side ledger.
 - 8-1. Purchasing Office
 - 8-2. Mine Office
 - 9. Incidentals.—To this account will be charged such items as follows:

Taxes Periodicals—Subscriptions
Insurance Telegrams
Traveling Expense Misc. items

- Traveling Expense Misc. items

 10. Cash Account.—This account is kept in the usual way, showing
- in the cash book.

 11. Treasurer's Account.—All funds received from the Treasurer will be placed to the credit of this account. In the event of the mine office making any expenditure on account of the purchase of any land, or any expenses in connection with the purchase of land, the expenditure so

cash Receipts, Disbursements and balance on hand as per details shown

made will be charged to this account. A full explanation of the transaction will be made on the voucher covering such expenditure.

12. Bills Audited.—This account will be credited with the footing of the Voucher Record for the month (Journal entry).

Debit this account with the footings of the "Audited Vouchers Paid" columns in the Cash Book. Posted from the Cash Book each month.

13. Sundry Labor.—Credit this account with the total Gross Earnings of labor as per time books. Labor as per time books for the month is spread on the Cost Sheet (Fig. 84) for distribution to the various accounts. The total of this sheet is the gross earnings for the month and will be placed to the credit of this account by journal entry.

Debit this account with the total footings of the "Sundry Labor" paid columns in the Cash Book, posted each month from the Cash Book in total. Also debit this account with all deductions from the Pay-roll which are credited to other ledger accounts or do not require a check to be drawn in settlement. This will be done by journal entry.

14. Taxes.—The total amount of taxes payable in each calendar year should be anticipated and will be pro-rated one-twelfth each month, chargeable to Incidentals and credited to this account.

When tax statements are paid at the end of the year they will be charged to this account. If the amount of taxes for the year as shown by the statement are not what was anticipated an adjustment of the difference will be made and spread over the remaining months in the fiscal year in equal amounts.

15. Insurance.—The total amount of Insurance premiums payable during the year will be anticipated and will be pro-rated one-twelfth each month, chargeable to Incidentals and a credit to this account.

When Insurance premiums are paid they will be charged to this account. In the event of additional Insurance being taken out during the year, or any changes in the schedule which changes the amount of premiums payable during the year, an adjustment will be necessary to conform to the new conditions. This adjustment made, the balance of the account will be pro-rated equally into the remaining months of the fiscal year.

In order to carry the proper amount of insurance on the various buildings and plant equipment, detailed schedule of the cost of each building and the equipment of each plant will be made up as called for by Construction Schedules. From these detailed costs such items as excavation and foundations, etc., will be eliminated and the amount of repairs, also the depreciation of each building and plant equipment will be considered in arriving at the Insurable value of each piece of property.

Copies of the detailed schedules on which Insurance is based will be kept on file at the general office for quick reference in the event of fire. Any amount received from the Insurance companies to cover loss and damage by fire, will be placed to the credit of the various accounts sustaining loss, according to the amounts allowed in the settlement schedule.

An Insurance map should be kept on file, showing the location, size, and insurable value of each building and plant equipment also all water lines and hydrants, electric and telephone lines. This map should be revised each year.

16. Aid Fund.—Collections on account of the aid fund are made through the Pay-roll. Payments are generally made through the Payroll. Collections and payments for this account are made according to the rules of the Aid Fund which follow:

AID FUND RULES

For the purpose of providing an aid fund to cover cases of death or injury by accident, the company agrees with its employees that the following rules shall be observed:

- 1. Employees whose names appear on the company's books shall be entitled to the benefits of the Aid Fund as hereinafter provided.
- 2. No person shall be considered as entitled to compensation from the aid fund, until he shall have become a member of it, by having worked at least three days for the company and paid one month's dues into the Treasury.
- 3. Members' contributions shall be considered as paid at the expiration of said three days, and shall be retained in the mine office until disposed of as hereinafter provided, the agent of the mine or his appointee being treasurer of the Aid Fund. The monthly dues shall be 50 cents.
- 4. There shall be a committee of five to manage the affairs of the Aid Fund to consist of the following: Head mining captain, Head mine physician, an officer of the company (to be selected by the company), also one miner and one surface man, to be selected by the first three annually.

Members applying for aid must in all cases obtain a certificate from the mine physician and deliver it or cause it to be delivered, to some member of the committee, who shall present it at the next committee meeting. The committee shall have power to accept or reject claims.

No money shall be drawn from the treasury except on the signature of the mine physician and of the member of the committee, representing the department of the mine in which said applicant is employed.

Regular committee meetings shall be held on the first Saturday of each month, at the Head mining captain's office. Special meetings shall be called by the chairman of the said committee, and shall be called by

him at the request in writing of three members of said committee. The committee shall have power to select members to fill vacancies.

- 5. Members disabled by accident occurring while actually engaged in work or labor for the company, shall recover one dollar for each working day lost thereby, provided that six days shall have been lost as a result of said accident. When a watchman is necessary to watch with the disabled, the committee shall hire a man, and pay him out of the fund, a sum equal to his daily wages for the time he shall have watched.
- 6. A member injured as above, and at the end of six months permanently disabled by said injury, may be discharged from the Aid Fund on receipt of \$200.00. If only partially disabled he may receive such compensation as the committee may determine.
- 7. A member disabled as a result of a disability or accident that occurred before his employment by the company is not entitled to the benefits of the Aid Fund.
- 8. During the period of his disablement as a result of injury, any contributor shall be exempt from the payment of dues.

Any contributor capable of performing an ordinary day's work shall not be considered as disabled.

- 9. Injuries received by a contributor while engaged in any act, business or employment, other than that assigned them by the company, will not be considered as coming within the provisions of the Rule 5, but injuries received by underground men in going down and coming up from the mine will be considered as entitling them to aid under the rules.
- 10. When a contributor dies from accidental injuries received while actually engaged in work or labor for the company, there shall be paid from the Aid Fund \$200.00 less funeral expenses (not to exceed \$100.00) when they are incurred or authorized by the committee. It is provided that in all cases of death, the payment shall be made exclusively to the relative, relations, or heir at law, of the deceased in the following order, First to the Widow, Second to the Children, Third to the Parents, Fourth to the Brothers and Sisters if shown to be dependent on the labor of the deceased.

Said payments shall be made in such amounts and at such times as the committee may determine, and when so paid all obligations on the part of the Aid Fund for account of such contributor shall cease.

11. The above amounts shall be paid in lieu of all stated monthly compensation, and when paid all obligations on the part of the Aid Fund for account of such contributor shall cease.

In no case shall the money to be paid as above be applicable to the debts of the deceased or liable to be attached by his creditors of said beneficiaries.

12. No death or disability from sickness will be aided.

In all cases of death, satisfactory evidence will be required that the death resulted from an accidental injury as aforesaid, and not from disease.

- 13. In case the committee named in Rule 4 shall decide that any one has obtained assistance from the Aid Fund by deceit, he shall be deprived of the benefit of the Aid Fund during such time as said committee shall specify in written notice to him and during the same time he shall be exempt from the monthly charge for dues.
- 14. The Mine Physician shall keep a record of all cases of accident and he is required to use all possible care and diligence to make his record accurrate and complete. In order that such a record may be kept, it shall be the duty of every person who desires or expects to receive aid, to give notice to the mine physician at once, on the occurrence of his disability, and likewise to give notice of the time of resuming work.

To avoid mistakes in names applicants for aid must bring their office pay book or docket, that their names may be entered correctly.

15. All points of dispute shall be decided by the committee and their decision shall be final in all cases.

The mine physician's record will in all cases govern the committee in making the estimates for aid and allowance for compensation.

- 16. Should a contributor, after giving notice to the mine physician, desire the services of another physician, it is not meant that the above rules shall debar him from that privilege, but the date of his inability and the period of its continuance, must be made known to the committee through the certificate of the mine physician, before favorable action by the committee can be expected. Certificates from other parties will not govern in the disposition of such cases, and to secure favorable action said contributor shall report progress from time to time to the mine physician and be examined by him.
- 17. When any contributor shall be discharged from the services of the company, or shall voluntarily cease to be an employee of said company he shall have no further claims upon said fund, nor rights to the benefits thereof.

MEDICAL ATTENDANCE

The following rules have been adopted for application to cases where the services of the mine physician may be requested.

1. Every employee of the company by paying the doctor fee as charged against him on the books of the company is entitled to medical attendance (including medicines) in all cases deemed necessary by the

mine physician both for himself and the ordinary members of his family that live under his roof and are dependent on him for support.

- 2. All children of employees between the ages of 16 and 19 years, if in the employ of the company or earning wages elsewhere and living on the mine location, must have paid the usual doctor fee in order to be entitled to medical attendance.
- 3. When a child of an employee between 16 and 19 years of age has worked for the company and been charged his fee he is entitled to medical attendance for the balance of the month. If he ceases to work for the company, except on account of disability, or works elsewhere for wages, he cannot after the expiration of the last month for which he has paid the regular fee, claim medical attendance for a member of his father's family. If, however, he shall have ceased to work for the company because of physical disability, he then is entitled to medical attendance equally with any other member of the family. Should said physical disability, however, be the result of injury or disease incurred or contracted during employment away from the mine, he is not entitled to free medical attendance.
- 4. A married daughter of an employee, not a widow who lives with her father, is not entitled to medical attendance, unless she shall have paid the regular fee in advance.
- 5. Visitors are not entitled to free medical attendance, employees having visitors that require medical attendance are ultimately responsible for the cost thereof.
- 6. When an employee of the company quits the latter's service after the tenth day of the month, and leaves his family at the mine, his family is entitled to medical attendance for the balance of that month.

In the protracted absence of the husband, the wife may pay the usual fee in advance and be entitled to medical attendance for himself and family.

- 7. Contractors living on the mine and generally any person or persons living on the mine not otherwise entitled to medical attendance, under the rules, may be admitted to the benefits of medical attendance for themselves and families, on payment of the usual fee in advance, and giving notice to the clerk of the company of their intention to do so.
- 8. Employees injured or diseased in consequence of being immoral, intoxicated or disorderly will be charged extra for medical attendance. Such accounts will be collected through the company office, unless promptly adjusted by the party to whom such attendance is rendered.
- 9. No claim to receive medical attendance will be granted unless good faith be shown by the claimant.
- 10. All cases not falling under any of the above rules will be passed upon by the company.

17. Supplies.—This account comprises the following sub-accounts in the side ledger:

 17-1. General Supplies
 17- 7. Pipe and Fitts.

 17-2. Iron and Steel
 17- 8. Oils and Grease

 17-3. Explosives
 17- 9. Electric

 17-4. Cement
 17-10. Tools

 17-5. Lumber and Timber
 17-11. Stamp Mill

 17-6. Machinery

18. Fuel.—This account comprises the following sub-accounts in the side ledger:

 18-1. Soft Coal
 18-5. Family Wood

 18-2. Hard Coal
 18-6. Boiler Wood

 18-3. Blossburg Coal
 18-7. Stamp Mill

 18-4. Coke

- 19. Accounts Receivable.—This heading is used to cover whatever accounts are necessary with individuals or corporations owing the company for services performed or supplies furnished.
- 20. Deferred Accounts.—This account comprises the following sub-accounts in the side ledger:
 - 20-1. Loss and Gain on Supplies, Adjustment
 - 20-2. Manufacturing Supplies
 - 20-3. Hoisting Ropes

SIDE-LEDGER ACCOUNTS—SHOP ACCOUNTS

0-1. Teaming.—Charge this account with expense of

Hired teams as per time book

Co. Team Account.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-2. Carpenters.—Charge this account with:

Carpenters labor as per time book Supplies as per supply book Elect. Lt. and Power proportion Heating System proportion Repairs to Shop and Equipt.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-3. Machinists.—Charge this account with:

Machinists labor as per time book Supplies as per supply book Elect. Lt. and Power proportion Heating System proportion Repairs to shop and Equipt. This account is closed out each month on a basit of labor performed, to the various accounts benefited.

0-4. Blacksmiths.—Charge this account with:

Blacksmith labor as per time book Supplies as per supply book Fuel as per supply book Elect. Lt. and Power proportion Heating System proportion Repairs to Shop and Equipt.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-5. Electricians.—Charge this account with:

Electricians labor as per time book Supplies as per supply book.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-6. Engineering Dept.—Charge this account with:

Engineers and assistants labor as per time book Supplies as per supply book Fuel as per supply book Electric Lt. and Power proportion Janitor service.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-7. Masons.—Charge this account with:

Mason labor as per time book Supplies as per supply book.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

Stamp Mill Shop Accounts are similar to the Mine Shop Accounts and are handled in the same way.

SIDE-LEDGER ACCOUNTS—CLOSED ACCOUNTS

0-10. Steam Plant.—Charge this account with:

Firemens labor as per time book Coal wheelers as per time book Supplies as per supply book Fuel as per supply book Water supply proportion Elect. Lt. and Power proportion Repairs to Building and Equipt.

This account is closed out each month on a basis of H. P. used, to the various accounts benefited.

Reports.—A monthly report (form 40, Fig. 23), is made out by the Master Mechanic in duplicate from daily reports, Fig. 24.

Date	Coal	Ashes	Water	Steam Pressure	Feed Water Temp.
1					
2			l		
8		l			
20		1			, ,
30 31 Total					

Fig. 23.—Form 40.

The original copy of the monthly report will go to the Superintendent, the duplicate copy to the Mine clerk. The weight of coal consumed must check with the amount charged to Steam Plant account on the supply book. Gallons of Water used must check with quantity charged to Steam Plant from the distribution of Water Supply account. Coal should be weighed as used, and ashes as removed from the pit. Feed water used can be measured with a Hôt Water Meter on the feed water line.

0-12. Electric Light and Power.—Charge this account with:

Engineers time as per time book Steam Plant proportion Heating System proportion Supplies as per supply book Repairs to Generating Plant Repairs to Transmission Lines

This account is closed out each month, to the various accounts benefited, on a basis of current used.

Three separate circuits are used, Power, Arc, and Incandescent lights. As a basis for figuring the distribution of current consumed by incandescent lights, we use a 16 candle-power lamp burning one hour. Power is distributed as per readings of meters at each consuming point.

Reports.—The Master Mechanic makes out a monthly report (form 42, Fig. 25) in duplicate, covering the operation of the generating plant. This report is made up from daily reports, form 42-A, Fig. 26.

	Boiler Nos.—	OJIBWAY M	-Boiler House R	eport	191	
		ighed Total Ash	Weighed	Total W Evapore		
	Remarks:					
	Fireman Day 8	Shift Fireman N	ight Shift			
COAL	WEIGHTS	ASH WEIGHTS	WATER	WATER METER READING		
			End of	Shift		
				Blow-of	īs	
			TIME	Water Level Before	Water Level After	
	-					

Fig. 24.—Form 40-A.

	K. W.	. Hours		Average			
Date	Power	Arcs	Incandescent	Volts	Amperes	Steam Pressure	
1							
2							
3							
30					1	!	
31							
Total	1						

Fig. 25.—Form 42.

	j .		OJIBW	AY MIN	ING CO	•	
	1			Elect	ric Power Pl	ant Report.	
	Generator	No				Date	19_
				v. Beceiver Pr		Power K.W.H lbs. Light K.W.H in. Total K.W.H	
	Remarks:						
	Engineer	Day Shift		Eng	ineer Night	Shift	
tarted up_			Started up Shut down			et lights on	
		HOURLY I	READINGS			Becording Wattr Readings	nete
TIME	VOLT METER	AMMETER	BTEAM	RECEIVER	VACUUM	POWER	
						Begin Day End Day Begin Day	
	1					End Day	
						Total	
						Total	
						LIGHT Begin Day	
						LIGHT Begin Day End Day	
						EIGHT Begin Day End Day POWER Begin Night End Night Begin Night	
						EIGHT Begin Day End Day POWER Begin Night End Night Begin Night End Night	
						EIGHT Begin Day End Day POWER Begin Night End Night Begin Night	
						EIGHT Begin Day End Day POWER Begin Night End Night Begin Night End Night Total	

Fig. 26.—Form 42-A.

The original copy of this report goes to the Superintendent and the duplicate to the Mine Clerk.

0-13. Compressor.—Charge this account with:

Engineers time as per time book Supplies as per Supply book Steam Plant proportion Electric Lt. and Power proportion Water Supply proportion Heating System proportion All repairs to building and plant

This account is closed out each month to the various underground openings on a basis of drill shifts worked. One compressor is steam driven, and one by motor.

Reports.—The Master Mechanic makes out a monthly report (form 41, Fig. 27) in duplicate for each compressor, from daily reports, form 41-A, Fig. 28.

Date	Revolutions	Cu. Ft. Free Air	Air Pressure	Steam Pressure	Temperatur Free Air
1			-		
2					
3					
30					
31	-		-		ļ
					ł.

Fig. 27.—Form 41.

When air is used for pumping or other work, the pumps, etc., will be rated at so many drill shifts by the Master Mechanic so that the whole account is distributed on a basis of drill shifts worked.

0-14. Power Drills.—Charge this account with cost of:

Sharpening Drills
New Drills
Hauling Drills to and from Shafts
Repairing Drill machines, posts and Tripods.

This account is closed out each month. The cost of sharpening and

hauling drills is distributed to the various underground openings on a basis of drill shifts worked. The cost of repairing drill machines is charged to the U. G. openings the machine last worked in. New drills are charged to the opening they are to be used in.

Reports.—The Blacksmith foreman will keep track in a pocket time book, of the drills sharpened for each shaft, separately, each day. He will also keep track of the number of Hand Drills, Moils, Picks sharpened

			OJI	BWAY M	UNING	CO.	
		_			0	ompressor Re	
	Compresso	r No				Dat	191
		-					lutions Day lutions Night
	Remarks.			Av, Te	mperature /	Air Free	Oompressed
	Engineer	Day Shift		E	ngineer Ni	ght Shift	
		HOU	RLY READ	INGS		Revolution Counter Readings	
TIME	BTEAM	ATR	RECEIVER	VACCUM	TURE AIR COMPRESSED	Deale Dea	
7 A.M.							Begin Day End Day
8 A.M.							End Day
12 ··			$\overline{}$				
1 P.M							
							
to							
7							
7							Begin Night
8							End Night
to	T			i e		\leftarrow	
12						1	
LA.M.							L
to			ļ			1	•
7	ļ ,		l	1	l .	1	

Fig. 28.—Form 41-A.

and Drills renewed for each shaft each day. A separate account should be kept of the tools sharpened and repaired for Surface account. The Master Mechanic will report at the end of the month, the totals for the items above mentioned to the Mine Clerk.

A Report, form 30, Fig. 29, showing the "Distribution of Power Drills" is kept by the clerk from information furnished by the shift bosses. They report each shift, the Machine number and where working, or if idle or sent to the shop for repairs, say so.

This report is a monthly report, and is spread on sheets as follows:

DISTRIBUTION	OF	PO	ME1	K D	KIL	L83.	Mo	nth.						
•	1	2	3	4	5	в	7	8	9	10		30	31	Tota
Drill No. 1-Shaft 1-Level 2-N.	2	2	2	2	2	2	<u>-</u>	_	_	_			_	14
Drill No. 1-Shaft 1-Level 2-S.	_	_	_	_	_	_		2	2	2	1	-		8
Shop		-	_	<u> </u>	_		_				1	x	x	
Drill No. 2-Shaft 2-Level 7-S.	2	2	2	1	_	_	_	_	_		1			7
Shop			_	x	x	×	x	x	x	x	1	x	x	
Drill No. 3-Shaft 2-Level 5-N.	2	2	2	1		_		_	x	x)			7
Drill No. 3-Shaft 2-Level 6-N.		_	_	1	2	2	2	2	2	2	1	1 2	2	19

Fig. 29.—Form 30.

From this report we get "Total Drill Shifts for the month."

"Total Drill Shifts for each opening."

"Total Drill Shifts for each machine."

A "Power Drill Record," form 43, Fig. 30, is kept for each machine by the Mine Clerk, showing the repairs on each machine in detail, each month, also shifts worked each month. This record covers a period of 12 months. The information for this record is taken from the "Distribution of Power Drills" and Record of Supplies Used.

Cost	Гуре	Rand	R-:	3			Ma	chine Num	ber 4
	J	an.	F	eb.	M	lar.	A	pr.	Totals
Shifts Worked		47		50		42		45	184
Chucks	1	5.00		Π	<u>'</u>		i	 (1 50
Side Rods	2	.60	_					<u> </u>	2 .6
Ratchets	_		1	.75					1 .7
Pawls			_)	
Pawl Springs			2	.50					2 .5
Chuck Bolts					1	.70			1 7
Chuck Bolt Nuts	_				2	.10			2 .1
Feed Screws			1	1.50					1 1.5
Handles			I				1	.90	$\left(\begin{array}{c c} \hline 1 & .9 \end{array} \right)$
Cylinders							1	5.00	1 5.0
Air Chests							1	2.00	1 2.0
Valves	_		_		_		1	1.75	1 1.7
Machinist Labor	_	1.60	_	.75			_	2.00	3.7
Smith Labor					_			2.00	2.0
Totals		6.60	_	3.50		.80	_	13.65	24.5

Fig. 30.—Form 43.

The above record is intended to cover the cost of keeping up the Power Drills and is not to include any labor or supplies for the repair of drill mountings, such as Tripods, Columns, Column Arms and Clamps. From the above records a special report is made out each month for the Supt., covering the month's operations of Drills. Form 43-A, Fig. 31.

POW	ER DRIL	L RECORD	1			1911
Drill Number	Shifts Worked	Supplies	Labor	Total Expense	Cost per Drill Shift	
				-		
		· ·		·	'	

Fig. 31.—Form 43-A.

0-15. Air Lines.—Charge this account with all labor and supplies to extend Air lines and repair the same underground. In making charges to this account the particular opening where the work is done must be specified.

This account is closed out each month to the various openings benefited with the cost of the work done in the particular opening charged.

Repairs to Air lines between the Compressors and the shafts will be charged to Surface expense.

0-16. Tramming.—Charge this account with cost of all labor tramming as per time book and with supplies used by trammers (candles, shovels, hammers, etc.).

This account is closed out each month to the various accounts (openings) from which rock is trammed, on a basis of labor performed.

Reports.—A "Trammer Boss's Report," form 36-A, Fig. 32, is made out by the Trammer Bosses each shift for each shaft. They fill in all information called for except tons, wages, distance, per ton 100 ft., which is filled in by the Mine Clerk. The tonnage per car is taken as the average for the previous month as shown by the Summary of Hoisting Record. As all trammers are paid the same wages the figuring of wages is simple. As regards distance, for stopes, raises and winzes it remains permanent, but for drifts and cross-cuts it changes as they advance. A table should be prepared showing the distances from the various openings

to the shafts, in the case of drifts and cross-cuts the figures will have to be changed from day to day as the work advances. The average advance in feet can be added for each shift worked as shown by the Power Drill Record. Cost per ton trammed 100 ft. is arrived at by dividing the cost by the number of tons, this result will then be divided by the number of hundred feet trammed. Distance is figured for one direction only.

The cars of good and poor rock as shown by these reports must check with the Hoisting Report turned in by the hoisting engineer. The time and wages shown must check with the time and wages as shown by the time book, charged to Tramming account.

"Monthly Record of Tramming," form 36-B, Fig. 33, this record is

				OJ		Y MINI			NY			
					ICAM	MEN BO	oo a ner	ORI.			No	
Shaf	₹ Na		-		Shift			1	Date			
	LEVEL		MILL		CARS ROCI		TONS	NO.	HOURS	WAGES	DISTANCE	PER TON
NO.	N	_	NO.	GOOD	POOR	TOTAL	IUMB	KZM	AUUAS	** 1025	DIBITATION	100
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			-					+				
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	BAIR	7						+	<u> </u>			
CUI	TING OU							+		ļ		†
		-						+				
	BREAD	r T						+-				†
								+			 	†
	TOTAL	.8						\top				<u> </u>
CAR	2		Tons									
D181	ANCE - F	EET E	MES			Tran	mer Boss				Ca	ptain
						2.000					-	_

Fig. 32.-Form 36-A.

made out from the Shift Boss's reports. The day and night shifts are shown separately on the record. This form is shown on the following page and explains itself.

"Rock Trammed Report."—Form 36-C, Fig. 34.—This record is made up from the Shift Boss's reports, and shows for each opening worked during the month, the cars of good and poor rock, both day and night shift, also cost per ton 100 ft. This record is used both as a comparative record and to furnish information required for the cost sheet.

0-17. U. G. Tracks.—Charge this account with all labor and supplies to lay or change underground tracks. In making charges to this account the particular opening in which the work is done must be specified.

This account is closed out each month to the various openings (accounts) on a basis of cost of work done.

0-18. U. G. Cars.—Charge to this account all labor and supplies to repair tram cars. In making charges to this account the cost of repairing

OJIBWAY, MICH.	TCH.						MON	THE	RE	CORE	MONTHLY RECORD OF TRAMMING.	RAMIN	NING.			Month of			
		Tone	Rock P		Distan	com feet	X cars									Daily Sheets No. to No.	ets No.	to	No.
	Day Start	Open C	Local Notes	UNDEBGROUND Control Tests	al Cura Di	Daily UNDERGROUND Ruck Broad MET TOTAL CARR TRANSIED Str. Conf. Carls Translets Str. Str. (Soc. Carls Translets Carls Translets Str. (Soc. Carls Translets Car	Good	Waste	TRAMMED	Tons	Treat Datament Transmit	in Description	dan Lab	Heore Labor Supplies Total	Total	Pent per Ind Transped 100 ft.	Du. Roleted	Shipped or Stateped	Con per Yast Du. Ghigmen er per Man per Transperd Holetted, Stangerd er per Man per 110 Ft.
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	55																		
	30																		
	100	-				+													
Paren	+							-											
tion.																			
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Fig. 33.—Form 36-B.

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	H	Ī	T	Π		H	H	П	T	t	H	t	Τ	T	T	T			Τ
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Month of Daily Sheets	U	į								ſ	۱	1		ſ	П	Γ	П		
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	U	1	ſ		ŗ	Г				ſ	0	ſ		ſ	П		П		
	Π	3	ſ			П		ſ			0	1		ſ			П		Γ
%	H	2				ſ	D	ſ		ſ	Ø	Ī		ſ	Ø		Г		Γ
Shaft No.	Ц	3	Ĺ	Ũ	Ũ	Ĺ	لَا	Ú	لَا	Ú	J		لَا	Ĺ	Д		Ø		Ĺ
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	μ	3	Ĺ	Ú	Ĺ	L	Ĺ	Ц	لًا	L	μ	۱	Ĺ	Ĺ	Ц	Ĺ	Ц	Ĺ	Ĺ
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	H	į	L	Ц	Ц	Ц	Ц	L	Ц	Ц	Ц	I	Ц	L	Ц	L	Ц	μ	\vdash
	Ц	8	L	Н	Ц	L	Ц	L	Ц	Ц	Ľ	اا	Ц	L	Ц	L	Ц	Ц	L
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T.	H	-	H	Н	Н	Н	Н	Ц	Н	Н	H	1	Н	H	Н	H	Н	H	\vdash
ROCK TRAMMED	H	8	H	Н	Н	\vdash	Н	H	Н	H	H		Н	L	Н	L	Н	\vdash	-
8	1	8	H	Н	Н	H	H	H	Н	H	4	1	H	H	Н	L	H	H	\vdash
PE I	l	-	H	Н	Н	H	Н	Н	Н	Н	H	H	Н	H	Н	H	Н	Н	Н
	H	8	H	Н	Н	H	H	H	Н	Н	H	۱۱	Н	H	Н	L	Н	Н	\vdash
	1	ð	1	Н	Н	\vdash	H	H	Н	Н	H		Н	F	Н	L	Н	H	Н
	1	-	1	H	Н	Н	Н	Н	Н	Н	H	۱	Н	۲	Н	Н	Н	Н	Н
ار جا	H	3	H	Н	Н	H	H	Н	H	Н	H	1	Н	Н	Н	H	H	Н	Н
13 E	ļŀ	3	H	Н	Н	H	Н	Н	Н	Н	H	۱	Н	Н	Н	Н	Н	Н	Н
A A	H	-	H	Н	Н	Н	Н	H	Н	Н	H	H	H	Н	Н	H	H	Н	Н
8 5 5	H	9	Η	Н	Н	Н	Н	Н	Н	Н	H	۱	Н	H	Н	H	H	Н	Н
F 10	H	3	H	Н	Н	Н	Н	Н	Н	Н	H	۱	Н	Н	Н	Н	Н	Н	Н
ZAX,	H	7	H	H	Н	Н	H	Н	Н	Н	H	١	Н	Н	H	Н	Н	Н	Н
AY MINING COM OJIBWAY, MIGH, feeded Cost is, per Ten	Н	Date Date Date Out Date Out Date Out Date Out Date Out Out Date Out Date Out	H		H	H	Н	H	Н	H	H	١	88	H	8	Н	24	Н	Н
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OJIBWAY MINING COMPANY OJIBWAY, MICH. Column Readed Cast to, per 7 on per 100.	Ħ		Ŕ	Nicht				H		۱	۱							8	F
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Fig. 34.—Form 36-C.

each car will be kept separate and the opening the car was last used in will be specified.

This account will be closed out each month to the various openings (accounts) benefited on a basis of cost of work done.

0-19. Pumping.—Charge this account with:

Pumpman's time as per time book Supplies as per supply book Compressor proportion Elect. Lt. and Power, proportion Repairs to Pumps and Pipe lines Repairs to Motors and transmission lines.

Separate account is kept with pumping in each shaft.

This account is closed off each month to the various openings worked during the month on a basis of tons of rock broken.

NOTE.—The cost of pumping in No. 1 shaft will be charged to the openings tributary to No. 1 shaft; the same applies to No. 2 shaft. The Master Mechanic will report to the Mine Clerk each month the quantity of water pumped from each shaft.

0-20. Timbering.—Charge this account with all labor and supplies used in timbering the mine openings. In making charges to this account it is necessary that the particular opening where the work is being done should be specified.

This account is closed off each month to the various openings benefited on a basis of cost of work done.

0-21. General Underground Expense.—Charge this account with:

Captains' time
Shift Bosses' time
Change house men
Wallers
Selectors
Sprinkler
Sharpening Tools
U. G. Surveying
Hauling explosives and tools to shafts
Shaft Repairs
All cost of operating and maintaining change house
All cost of operating and maintaining captains office.

This account is closed out each month to the various openings active during the month, on a basis of tons of rock broken.

0-22. Hoisting.—Charge to this account:

Engineer's time as per time book Surface Landers as per time book Supplies used as per supply book Steam Plant proportion Elect. Lt. and Power proportion Heating System proportion Hoisting ropes proportion Repairs to Pulley stands and skips Repairs to building and plant.

This account is charged off each month to the various active underground openings on a basis of tons of rock hoisted from the openings.

Reports.—A "Daily Hoisting Record" (form 16, Fig. 35) is made out each shift for each shaft by the hoisting engineer; the original copy

-		jibway, l		MPANY			
					Hoisti	ng Record	Shaf
For t	the		Shi	ft		Date	19
	LEVEL NUMBERS	SKIPS COPPER ROCK	BKTP8 POOR ROCK	TOTAL SKIPS	SKIPS MEN	TIMBER SUPPLIES	REMARKS
	1						
	2						
=	3						
\equiv	15						
	TOTAL						

Fig. 35.—Form 16.

	OJ	IBV	VA:	Z MC	INI	RO NG	CK CO1	E H	IOI NY	ST	ED	Sha	n_		Shi	n_	м	onth o	<u></u>	
	LEVEL	1	2	3	4	5	6	7	8	9	10	11		13		15		Total Hoist	R.H. Diseard	
	Date 1							Г												
	2																			
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	Total																			

Fig. 36.—Form 20-A.

goes to the mine clerk, the duplicate to the captain. Rock hoisted figures on these reports must check with those shown on the trammer bosses' reports.

The Rope Travel is figured from this record.

A "Rock Hoisted," form 20-A, Fig. 36, monthly record is kept, separate sheets being kept for each shift. This information comes from the daily Hoisting Record.

	OJI	DW	<u> </u>		1417			4	17.1	_	_	_	_		onti	· w_			
	TEART	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1.5	Poor Rook	Total Hoist	R. H. Discard
	Shaft No. 1 Day																		
	Night	_	<u> </u>	L	_	_	_		_	_	_	_		_	1_	_	<u> </u>		↓
	Total						<u>L</u>	_								L			
	Bhaft No. 2 Day								_			_	_						
\bigcirc	Night	<u> </u>	_	_	_		_			<u> </u>	_	_		<u>L</u>	L	L.			
	Total	L														L	<u></u>		
	Shaft No. 8 Day	L											_	<u> </u>	L	L			<u> </u>
	Night		L		_		_		<u> </u>	_	_	_	L	L_	<u> </u>	_			<u> </u>
	Total								l					_		L			
	Shaft No. 4 Day												L		L	L			<u> </u>
	Night	L	L	_	oxdapsilon	<u> </u>	L	<u> </u>		_	L	<u> </u>	_	<u> </u>	L	L			↓
	Total		L_{-}						<u> </u>			l							
	Hoisted this year																		<u> </u>
	No. 1 Shaft	L	<u> </u>	_	L	L	_	<u> </u>	ot	_		_	<u> </u>	<u> </u>	<u> </u>	<u> </u>			ــــــ
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Fig. 37.—Form 20-B.

			RY OF	HOIS	TING R					
	Ojibway Mining Com					Month				
		Skips	T NO. 1	BHA) Skips	T NO. 2	Skips	Toos	Skips	TAL	$\overline{}$
	1,11,11	Barge	1965	Serips	146	OLUPS .	IVES		100	†—
	All Rook Day	 		-				<u> </u>		╁
	Night	├						ļ		<u> </u>
L	Total Reek, Mouth	<u> </u>								
	Total Book, Year	<u> </u>								
	Poer Book, Day									
	Night									
	R. H.									
	Total Pour Rock, Month									
	Total Poor Reck, Year									
	Stamp Rock, Month	1								\vdash
<u> </u>	Stemp Reek, Year	†								1
	Rock Shipped, Month							l		T
	Rock Shipped, Year									
	Per Cent, Poer Book, Month									
	Per Cent, Poor Rock, Year							1		
	Average Lend Per Skip									
								-	·	
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Fig. 38.—Form 20-C.

These sheets give a detailed record of the rock coming from each level during the month from each shaft, and for both day and night shift.

These sheets will be kept up to date by the Mine Clerk.

A "Summary of Rock Hoisted," form 20-B, Fig. 37, record is made out each month by the mine clerk. This record is a summary of the "Rock Hoisted" monthly records. It is self-explanatory.

A "Summary of Hoisting Records," form 20-C, Fig. 38, is made up by the Mine Clerk. This record is different from the Summary of Rock Hoisted in all particulars although most of the information required comes from them. The Stamp rock is the difference between the total hoist and the poor rock discarded. The amount of rock shipped comes from the Rock Shipped record. The average load per skip is arrived at by dividing the tons of rock shipped by the number of skips of good rock hoisted. We assume that the rock bins are full at the first and the last of each month.

0-23. Rock House.—This account is charged with:

Rock House labor as per time book Supplies used as per supply book Elect. Lt. and Power proportion Repairs to building and equipt.

This account is closed out each month to the various openings underground on a basis of tons of rock hoisted from each opening.

0-24. Water Supply.—Charge this account with:

Pumpmen's time as per time book Supplies as per supply book Steam Plant proportion Electric Lt. and Power proportion Repairs to building and Equipt. Repairs to pipe lines and hydrants.

This account is closed out each month to the various accounts benefited on a basis of water used. Water furnished to company dwellings, boarding house, and barn will be charged to Surface Expense. The Master Mechanic will report to the Mine Clerk each month the quantity of water pumped.

0-25. Heating System.—Charge this account with:

Steam plant proportion Supplies used as per supply book Repairs to Vacuum pump, pipe lines and radiators.

This account is closed out each month to the various accounts benefited on a basis of square feet of radiation in the various buildings heated.

0-26. Company Team Account.—Charge this account with company teamsters as per time book:

Supplies and Forage as per Supply book Repairs to Barn, Wagons, Sleighs, Harness Veterinary services.

This account is closed into Teaming each month.

- 0-27. Clearing Land.—Charge this account with all labor and supplies used incident to clearing and grubbing the same for any purpose. Close this account into Surface Expense each month.
- 0-28. Highways.—Charge this account with all Surface and Teaming labor also supplies used in building New Highways or repairing old ones on company property. Close this account into Surface Expense each month.
- 0-29. Rents.—Charge this account with all labor and supplies used to repair and maintain all dwellings and other buildings on which the company collects rent. The charges to this account are intended to cover all cost of repairs and ordinary alterations on buildings mentioned above.

Additions to buildings and new foundations, cellars, etc., will be treated as New Construction.

This account is credited with all rent collected, both for buildings and leased land.

The balance of this account each month is closed into Surface Expense.

Application for Dwelling.—Any employee desiring a dwelling must have worked for the company at least 30 days before an application will be considered. A regular form is used for this purpose as follows, form 19, Fig. 39.

This form must be filled out by the applicant and approved by his foreman before being sent to the Mine Clerk. The allotment of houses is a matter of judgment, with the best interests of the company in view. Houses are allotted by the Superintendent.

Dwelling Lease.—Form 17, Fig. 40. When an application is allowed and a house allotted, the Mine Clerk will make out in duplicate a Dwelling Lease, which must be signed by the Superintendent for the company and by the applicant. The original copy goes to the applicant and the duplicate is placed on file in the mine office. When a dwelling is vacated the lease is so endorsed and removed from the live file.

Land Lease.—Form 18, Fig. 41. A person wishing to lease land from the company for building or other purposes, will make application to the Superintendent, and on the approval of the General Manager, a Land Lease will be made out in duplicate, covering the particular piece of property in question. This lease will be signed by the Superintendent for the company and by the applicant, also by his wife if he is a married man. The original copy goes to the applicant, the duplicate to the mine clerk to be placed on file. In the event of a party disposing of his building and

1		1
1	This is to certify that	
	ployed in my department ase month last past, and that his work has been satisfactory. I	
	e month tast past, and that his work has been satisfactory. I porable action on his application for a dwelling-house.	recommena
1 7400	orable action on his application for a aweating-nouse.	
	190	
	The undersigned hereby makes application foruse, and promises to fulfil all requirements of the Company in same, when it shall have been assigned to him.	reference to
ļ	Name	
	Occupation	., 0
	Occupation Married or Single	
	Names and ages of children	

	Name and address of next nearest of kin:	
,	7 4 1	
	Last place of employment	
	Date of application	
	Fig. 39.—FORM 19.	
	FIG. 39.—FORM 19.	
surrenc	dering his lease, a proper surrender and release of t	he same must
	wn up and signed. The original lease should be su	
	lease attached to it and placed on file.	
UIIIS I CI	<u>-</u>	
	DWELLING LEASE	
DWELLI	NG OR BOARDING HOUSE LEASE. (COPY)	Form 17 9-7-50
	Agreement, Made thisday of	A. D., 19
This Th	EN the, a corporation de	
		uly organized unde
BETWE	of the State of Michigan, party of the first part, and	
BETWEE	of the State of Michigan, party of the first part, and	
BETWEI the laws of the Cor	of the State of Michigan, party of the first part, and	th let, and the said

To be used and occupied solely for a dwelling house—boarding house for boarding and lodging the employes of the party of the first part by the party of the second part—for which said party of the second part agrees to pay to said party of the first part
or shall refuse or neglect to keep said premises in good preservation (ordinary wear and tear and damages by the elements excepted); or shall continue to occupy or hold, or suffer to be occupied or held, said premises beyond
It is further agreed, that should the said party of the first part wish to terminate the tenancy hereby created, for any cause or reason whatsoever, other than those mentioned in the preceding conditions (although said party of the second part should have fulfilled, performed and kept each and every condition and covenant thereof), it may do so at any time by giving said party of the second part so the said party of the second part so the variation of any rental period), and at the expiration of such
Fig. 40.—Form 17.
LAND LEASE
Form 18 9-7- 300
Chts Indenture. Made this
all in Keweenaw County, Michigan.

To be used by said partof the second part whilehein the employ of the said
party of the first part, as a place for the erection of a Dwelling House and its appurtenances, to be
occupied byand for no other purpose, without the written consent of the said party of the
first part first obtained.
It is expressly agreed that said partof the second part shall have the use of said land for the
purpose above mentioned only whilecontinuein the employment of said first party.
It is further agreed that, whenever said partof the second part ceaseto work for
said party of the first part, for any cause,shall, within
days, provided the rent then due from said second partto said first party is then paid in full,
(and if any bonus paid by said first party to second partis repaid to said first party by
said second part) remove any Dwelling House or other buildings and appurtenances erected
upon said premises by, and leave said premises in as good condition as when
entered upon; unless said party of the first part elects to purchase said Dwelling House, or other
buildings and appurtenances.
It is further expressly agreed that said first party may at any time at its option, upon ninety days'
written notice, terminate this lease and purchase said Dwelling House, or other buildings and appur-
tenances which may have been erected upon said premises by said second part,
heirs or assigns. Notice of the election of said first party to so purchase shall be deposited in the
United States mail in the Post Office at Michigan, enclosed in a sealed envelope, with
legal postage thereon fully prepaid, addressed to said partof the second part,heirs
or assigns, at his, her, their, or any of their last known place or places of residences; and on the
expiration of ninety days after said notice is so deposited as aforesaid, in said Post Office, said lease
shall thereby be terminated.
Whenever under any of the terms of this lease said first party shall elect to purchase said Dwelling
House, or other buildings and appurtenances, which may have been erected upon said premises by
said second partheirs or assigns, it may do so at the value thereof, to be deter-
mined by the Superintendent of said first party and said second part, orheirs,
executors, administrators or assigns, within ten days from the date of the notice of the election of said
first party to purchase; and in case they cannot agree upon said value within said ten days, then they
shall, within five days after the lapse of said ten days, select some competent person to determine
the same, who shall determine the same within ten days after his selection: and in any event in com-
puting said value there shall be deducted by the persons or person determining the same, any and all
rent then due, or to grow due from said second partheirs or assigns, to
said first party, (and also any bonus paid to said second partby said first party) which sum after
making said deductions, shall be paid by said first party to said second part, heirs
or assigns, if and when said second partheirs or assigns shall vacate and sur-
or assigns, if and when said second part, heirs or assigns shall vacate and sur- render said premises to said first party.
render said premises to said first party.
render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors,
render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be
render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second partfor said above demised premises, and each and every installment thereof,
render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second part
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render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second partfor said above demised premises, and each and every installment thereof, (and any bonus that may have been paid by said first party to said second part) shall be and are hereby declared to be a valid and first lien upon any and all buildings and improvements that may have been, or that may at any time in the future be erected, placed or put upon said premises by said partheirs or assigns, and that whenever and as often as any installment of rent shall become due, and remain unpaid fordays after the same becomes
render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second part
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render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second partfor said above demised premises, and each and every installment thereof, (and any bonus that may have been paid by said first party to said second part) shall be and are hereby declared to be a valid and first lien upon any and all buildings and improvements that may have been, or that may at any time in the future be erected, placed or put upon said premises by said part
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render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second partfor said above demised premises, and each and every installment thereof, (and any bonus that may have been paid by said first party to said second part) shall be and are hereby declared to be a valid and first lien upon any and all buildings and improvements that may have been, or that may at any time in the future be erected, placed or put upon said premises by said part
And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second partfor said above demised premises, and each and every installment thereof, (and any bonus that may have been paid by said first party to said second part) shall be and are hereby declared to be a valid and first lien upon any and all buildings and improvements that may have been, or that may at any time in the future be erected, placed or put upon said premises by said part
render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second partfor said above demised premises, and each and every installment thereof, (and any bonus that may have been paid by said first party to said second part) shall be and are hereby declared to be a valid and first lien upon any and all buildings and improvements that may have been, or that may at any time in the future be erected, placed or put upon said premises by said part
render said premises to said first party. And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second partfor said above demised premises, and each and every installment thereof, (and any bonus that may have been paid by said first party to said second part) shall be and are hereby declared to be a valid and first lien upon any and all buildings and improvements that may have been, or that may at any time in the future be erected, placed or put upon said premises by said part feet of event and installment of rent shall become due, and remain unpaid for
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And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second partfor said above demised premises, and each and every installment thereof, (and any bonus that may have been paid by said first party to said second part) shall be and are hereby declared to be a valid and first lien upon any and all buildings and improvements that may have been, or that may at any time in the future be erected, placed or put upon said premises by said part
And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second part
And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second part
And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second part

in this paragraph contained shall operate as an immediate forfeiture of this lease, and thereupon said first party, its successors or assigns, may, without notice, immediately bring an action under the

behalf by its Superintendent, thereunto duly as handand sealthe day and year first	thorised, and said second parthaset above written.
Signed, Sealed and Delivered in presence of	
	Superintendent. [L. S.] [L. S.]
,	
	L.—Form 18.

Rent Record Cards.—In order to keep a proper record of each dwelling, the rent collected, occupants, repairs, etc., a record is kept with each dwelling on cards (form 32, Fig. 42). When a dwelling lease is executed and the duplicate copy is received by the Mine Clerk, he will enter on the Rent Card assigned to the house in question, the date of the lease, the occupant's name, his pay book number and in case he is only

DWELLING		TYPE	Bingle Dealte Toxessess	BUILT	BY		COST		
ROOMS	UP	DOWN	CELLAR	BARN		LIGHT	3		
Occupied		Ladivid	nal	Vacated	Ourupled		Individual		Vacated
									-
				\leftarrow					+=
MONTHLY	RENTAL		WATE	B CHARGE		IS V	VATER INSID	E?	
19	19	19	19	19	19	19	19	19	19
Jan.							1		
Peb.								1	
to I									
		$\overline{}$					=	\mp	7
Nov.				_i	L				
Dec.									

Fig. 42.—Form 32.

renting part of a house, that is, the up or down stairs, that must also be shown. The rental per month for each dwelling or part thereof is fixed by the Superintendent.

An employee vacating a rented house cannot secure a settlement from the Clerk, until the house has been examined and reported upon by the Carpenter Foreman. Any damage to a dwelling caused by ill usage will be charged to the occupant.

On the reverse side of the Rent Cards will be posted each month the details of any repairs made.

STAMP MILL—CLOSED ACCOUNTS

0-40. Steam Plant Stamp Mill.—Charge this account with:

Firemen as per time book Coal passers per time book Water Supply, proportion Elect. Lt. and Power, proportion Supplies as per supply book Fuel as per supply book All repairs to building and plant.

This account is closed out each month to the various accounts benefited on a basis of horse-power used.

0-41. Pumping Stamp Mill.—Charge this account with:

Engineers as per time book
Steam Plant, proportion
Elect. Lt. and Power, proportion
Supplies as per supply book
All repairs to building and Equipt.

This account is closed out each month to the various accounts benefited on a basis of water used.

0-42. Electric Light and Power Stamp Mill.—Charge this account with:

Engineers as per time book Steam Plant, proportion Supplies as per supply book All repairs to Generating Plant and Equipt.

This account is closed out each month to the various accounts benefited on a basis of kws. used.

- 0-43. Rolls.—Charge this account with all labor and supplies to operate and maintain the Rolls. This account will be divided between the Heads, on a basis of cost for the month for Rolls for each Head.
- 0-44. Regrinding.—Charge this account with all the labor and supplies to operate and maintain the Regrinding Mills. This account will be closed out each month to the Heads, on a basis of cost for the month for Regrinders for each Head.
- 0-45. Screens and Elevators.—Charge this account with all labor and supplies to operate and maintain the Elevators and revolving Screens. This account will be divided between the Heads on a basis of cost of Screens and Elevators for the month for each Head.
- 0-46. Jigs.—Charge this account with all labor and supplies to operate and maintain all Jigs. This account will be closed out to the Heads each month on a basis of cost of Jigs for the month for each Head.
- 0-47. Tables and Vanners.—Charge this account with all labor and supplies to operate and maintain the Tables and Vanners. This account will be closed out to the Heads on a basis of cost of Tables and Vanners for the month for each Head.
- 0-48. Conveyor.—Charge this account with all labor and supplies to operate and maintain the waste sand Conveyor. This account will be closed out to the Heads on a basis of tons stamped.

- 0-49. Laboratory.—Charge this account with all labor and supplies to operate and maintain the Laboratory. This account will be closed out to the Heads on a basis of tons stamped.
 - 0-50. Wash Account.—Charge this account with,

Wash Foreman as per time book

Wash laborers as per time book

Supplies as per supply book

All labor and supplies to operate and maintain the Wash department except Rolls, Regrinding Mills, Jigs, Tables and Vanners.

This account will be closed out to the Heads on a basis of tons stamped. 0-51. General Expense.—Charge this account with:

Office expense

Surface Expense

Rents-balance

Waters Supply, proportion

Elect. Lt. and Power, proportion

All labor and supplies to repair and maintain the Mill building, Rock bins,

This account will be closed out to the Heads on a basis of tons stamped.

0-52. Rents, Stamp Mill.—Charge this account with all labor and supplies to repair and maintain all dwellings and other houses at the mill on which the company collects rent. This account will receive credit for all rents collected. The account is closed out to General Expense.

SUB-ACCOUNTS-SIDE LEDGER

- 2-1, Etc. Construction Accounts.—A separate account is kept with each.
 - A. Building
- F. Electric and Telephone Lines
- B. Equipt. of each Plant
- G. Dams
- C. Water Lines
- H. Railroads
- D. Sewer Lines
- I. Trestles
- E. Air Lines on Surface
- J. Portable Machinery and Equipment.

In making charges of labor and supplies to any construction accounts, the following subdivisions will be observed, in order to have proper information of costs in comparing like jobs and for insurance purposes.

BUILDINGS

- A. Excavation

- B. Grading and Filling
- F. Heating plant
- C. Foundations
- G. Bath room fixtures, lavatories
- D. Superstructure
- H. Painting inside and out I. Barn and outhouses.
- E. Electric Wiring and fixtures

COMPRESSOR EQUIPMENT

A. Foundations D. Supplies

E. Installation complete. B. Compressor cost

C. Receivers cost

ELECTRIC PLANT EQUIPMENT

F. Transmission lines A. Foundations B. Generating outfit cost G. Telephone lines C. Installation H. Transformers I. Misc.

D. Switchboard cost

E. Installation

HOISTING EQUIPMENT

A. Foundations D. Installation

B. Hoists cost E. Pulley Stands, Sheaves

C. Supplies F. Ropes.

PUMPING PLANT

D. Installation A. Foundations B. Pumps cost E. Misc.

C. Condensers cost

ROCK HOUSE EQUIPMENT

A. Crushers cost D. Power Transmission

B. Hammers E. Installation

C. Motors, etc. F. Misc.

SHOP EQUIPMENT

A. Foundations D. Power Transmission E. Installation.

B. Tools itemized C. Motors and Transformers

STEAM PLANT EQUIPMENT

A. Foundations F. Economizer B. Boilers cost G. Installation H. Stack complete C. Breeching cost

D. Pumps

E. Feed water heater

PIPE LINES

I. Misc.

A. Excavation D. Pipe covering complete B. Pipe and Fittings E. Filling.

C. Installation

DAMS

A. Excavation C. Filling B. Concrete work D. Misc.

RAILBOAD

- A. Grading and Filling
- C. Rails and Ties

B. Culverts

D. Misc.

TRESTLES

- A. Excavation
- D. Floor

B. Piling

E. Misc.

C. Structure

PORTABLE MACHINERY AND EQUIPMENT

- A. Rock Drills
- F. Portable Hoists

B. Pumps

- G. Derricks
- C. Tram Cars
- H. Sinking Buckets

D. Skips

- I. Live Stock
- E. Portable Boilers
- J. Wagons, Sleighs and Buggies.

Into this account should be charged machinery and equipment that will not be used permanently in one place, so that it cannot be charged to some construction or equipment account.

- 3-1, Etc. Development Accounts.—Separate accounts will be kept as follows:
 - A. Shaft Sinking, separate account each shaft.
 - B. Shaft Construction, separate account each shaft.
 - C. Plats, separate account each shaft.
 - D. Crosscuts, separate account each one.
 - E. Raises, separate account each one.
 - F. Winzes, separate account each one.
 - G. Drifts, separate account each one.
 - H. Diamond Drilling.
 - I. Surface Exploration.

Each of these accounts is made up of the following, except Diamond Drilling and Surface Exploration.

- A. Miners labor
- G. Pumping, proportion
- B. Miners supplies
- H. Timbering, proportion
- C. Compressor, proportion
- I. Tramming, proportion
- D. Air lines, proportion
- E. Power Drills, proportion
- J. U. G. Cars, proportion
- F. General U. G. Expense,
- K. U. G. Tracks, proportion
- L. Hoisting, proportion
- proportion
- M. Rock House, proportion.

The cost of Shaft Sinking is intended to cover all labor and supplies used by miners in sinking plus a proportionate part of the other accounts. This statement also applies to Drifting, Raising, Winzes, Crosscuts and Plats.

The cost of Shaft Construction is intended to cover all labor and supplies used for Timbering, building Skipway and Tracks, Ladder road, Concrete Collar, Water lines, Air lines, Bell lines. The cost of Diamond Drilling is intended to cover all labor and supplies used in running and

maintaining the drill and moving the same from place to place, plus a proportionate part of Compressor expense for power.

Surface Exploration is intended to cover all labor and supplies used in surface trenching, etc.

For Diamond Drill work a daily report is made out by the drill runner on (form 60, Fig. 43), covering the operations and results of the work for the shift; reports for each shift worked will be sent to the Superintendent.

		MINING CO
Daily Repo	ort.	Shift
Name of Drill	***************************************	***************************************
		190
Depth from Surfac		Fee
	eginning " "	
Distance Drilled,		
inch Stand		
" Casin		
From Feet	To Feet	Material
l l		
	1	
Remarks		

Fig. 43.—Form 60.

The details of the cost of Diamond Drilling is entered on cards (form 61, Fig. 44) the cost data on one side and the operating data on the other side.

- 4-1, Etc. Mining Expense, Stoping.—A separate account is kept with each stope, made up of the following:
 - A. Miners' labor
 - B. Miners' supplies
 - C. Compressor, proportion
 - D. Air lines, proportion
 - E. Power Drills, proportion
 - F. General U. G. Expense, proportion
- G. Pumping, proportion
- H. Timbering, proportion
- I. Tramming, proportion
- J. U. G. Cars, proportion
- K. U. G. Tracks, proportion
- L. Hoisting, proportion
- M. Rock House, proportion.

		ı				l				İ		I				
			OP	OPERATING DATA	4G D/	YTA										
Maker of Drill																
Dritt Na			Dia	Diameter of Core	fCon											
	Time	7	Distance	Days Labor	D P P	_	Feet per Man per Shift	r No.Men F Employed	den							
Moring		-				-	-									
Setting Up		l							COST DATA	Ā					8	Reverse Bide
Stand Piping						ξ.					i					
Drilling Ledge		•	•			9	ramon	\$ 5	Damona Dru Bole No.	Na		i				
Laying ft. Water Pipe		3	Location						Company	any						ļ
Dismantleing		٩	Date begun-	"u			-Dat	e Fini	_Date Finished				Tot	Total Time.		ļ
				-				NI TSO	COST IN DOLLARS	<u>چ</u>			H			
				-	Labor	Teaming	⊢–	Ooel and Supplies	Diamonds	-	Use of Machine	Total	7	Foot	Cost	Cost per Foot of Ledge
	I A	owing	Moving & Betting up	dn 8	H			\vdash	L		-		L		-	
		Stand Pipe	8 H	-	L			-								_
•	Ī	Hilla	Drilling Ledge	_	L											L
	1			_	-						-					_
	L_ 			-	-			 							-	_
	H	Totals			_											
	ŏ	of be	Oost per ft.of Hole	le									_			
	0	at pe	Oost per ft.of Ledge	e g	_		_	-		Ė						
	L															
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		T	\Box). M.				Ι	-	Mai	k M	rk boll	ers in use. If b	oller is shu	down rej	ort se	D4.	
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		+			Ď.					5									
					J. m.											No. of C	ers T	otal	Welgh
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Circuit	No 1							1		C	trout	t No. 1	\perp						
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				MILL RI	UNNE	ER 7 A.	w. TO 6	Р.М.							MILL I	UNNER 6	P.M. T	07	A.M.

Fig. 45.—Form 105.

OJIBWAY MINING COMPANY MILL DEPARTMENT Daily supply report for 24 hrs. beginning 7 A.M. .191.... SHOES Old shoes taken off New shoes put on Head No. Maker Mark Time Weight Maker Mark Time Weight OILS AND WASTE Oil put in tanks Where used Cylinder Engine Lubricating Heads Wash Mill Boilers Pumps Tank reading Report name, gallons and kind of oll put in tanks. REPAIRS Bepairs include all castings (hard and soft) grates, screens and liners of all kinds. Casting Weight NAME AND REMARKS No. REMARKS Millrunner 6 P.M. - 7 A.M. Millrunner 7 A.M. - 6 P.M.

Fig. 46.—FORM 106.

The cost of Stoping is intended to cover all labor and supplies for breaking rock in stopes, plus proportionate part of the other accounts.

6-1. Etc. Stamping Head No. 1-Expense and Head No. 2-Expense.— These accounts comprise the following charges:

- A. Mill runners as per time book
- B. Head runners as per time book
- C. Head feeders as per time book
- D. Spare hands as per time book
- E. Steam Plant, proportion
- F. Pumping, proportion
- G. Elect. Lt. and Power-Power, proportion
- H. Elect. Lt. and Power-Light, proportion
- I. Revolving Screens and Elevators. Proportion
- J. Rolls, proportion
- K. Regrinding, proportion
- L. Surface
- M. Carpenters
- N. Machinists
- O. Blacksmiths
- P. Teaming
- Q. Electricians

F. Electric Power, proportion

R. Supplies

Wash

- A. Foreman, proportion
- B. Labor, proportion
- C. Shop Labor
- D. Supplies
- E. Electric Light, proportion
- G. Jigs, proportion H. Tables, proportion
 - I. Conveyor, proportion
 - J. Laboratory, proportion
- GENERAL
- D. Electric Light and Power A. Office Expense
 - E. Rents
- B. Surface Expense
- C. Pumping

Dalk	y Report for	r the S	4 hours begin	ming 7. s. m.		 1	90	-
Grade	No. of Bbla,	Net	Weight					
				Rock received		 Ca	78	
				Coal put in bin		To	ns	
				All heads run	Hours	 Mi	nute	8
				Mill run	Hours	 Mi	nute	8
				General tailings for				
				Mineral shipped				
				Mineral at Mill				
Totals				Total Mineral to date				L

Fig. 47.—FORM 111.

The Stamp Mill accounts are made up from the time books, which contain the distribution of labor and detailed statement of supplies used.

Reports covering the operation of the Electric, Steam, and Pumping plants at the mill are similar to those employed at the mine.

A Daily Report covering the operation of the mill will be made out each day to cover 24 hours. See form 105, Fig. 45.

A Daily Supply Report (form 106, Fig. 46) covering the consumption of supplies, a record of the wear of stamp shoes, and a statement of the repairs to Heads, is made out each day by the Master Mechanic and sent to the Mill Superintendent.

A Daily Mineral Report (form 111, Fig. 47), is made out each day in duplicate; one copy will go to the mine clerk and a copy to the Mill Superintendent. Both the Mine and Mill clerks will enter these daily reports in books ruled for the purpose, showing the various grades, form 101, Fig. 48.

	RAL STA	remen1		Mo	onth of		
Date	Brl. Wk.	Hds.	#1	#2	#3	#4	Tota
1	-						
2							
3							
				<u> </u>			
30							
30 31							

Fig. 48.—Form 101.

The calendar month is divided into four periods for convenience, as follows, 1st to 7th, 8th to 14th, 15th to 21st, and 22nd to last day of the month inclusive. A Mineral Report (from 107, Fig. 49), will be made out at the end of each period, showing the mineral shipped for the period, also for the month to date, and such other information as the report calls for. Send one copy to the General Manager and one to the Superintendent.

From form 107 the General Manager makes out a report to the Head Office on form 26, Fig. 50.

		OJIE	BWAY MINING CO)	
		1	MILL DEPARTMENT		
			Winona	Mich	
			the period ending		
GRADE	Not Weight	Total Not Wt. to date	Chara rook received	Total to date	
H			Cars rook stamped	Total to date	
1			Tens rock stamped	Total to date	
2			Average remains time per bead	hrs.	ngla.
3			Average number tons rook stamped	per head, per 24 hours)
Regrinding			Average number tons reek stamped	per bead, per 24 hours	maning time
Mass			Number pounds mineral, per ton re	eck stamped	
Totals					
PEMARES					
					MILL SUPP.

Fig. 49.—Form 107.

Form 26-500- PERIO 1st to 7th—1 8th to 14th— 15th to 21st— 22nd to Last	ob st -2nd	4th	Ojib	•	Mining	Company PORT	мс	о нтн 1	9
	Cars Rock Brought to Mill	Tons Rock Brought to Mill	Tons Rock Stamped	Pounds Mineral per Ton Rock Stamped	Grade	Pounds Mineral	Per cent.	Per cent. of Mineral per Ton Rock, Mill	Average of Tailing Assay
Period									
Total from 1st of mo. to date.									
Pounds H	eavy (Copper	from	Mine					
Total Min	eral fo	r Mon	h			2.70	•		
Remarks:					Yours Re	spectfully,	_		
				•••••		•••••	Gen. Mgr		

Fig. 50.—Form 26.

8-1. Office Purchasing Agent.—Charge this account with the following:

Postage

Purchasing Agent, salary Stenographer, salary Rent and Light

Supplies Janitor service

Telephone

8-2. Office Mine.—Charge this account with the following:

Superintendent, salary Clerk and Assts., salary

Supplies

Stenographer, salary Timekeeper, salary Janitor services

Heating system Electric Light Telephone

17-1. General Supplies.—All supplies not provided for by other subdivisions of the supply account are placed under this head.

17-2. Iron and Steel.—Included under this head are:

Bar Iron and Steel Iron and Steel Plate Wire rope Chain

Structural steel

Corrugated Iron Bolts, all kinds Tram cars

Castings Rails and fastenings Nails and spikes

Skips Sheaves

Drill and tool steel Air Drills and parts

Sinking buckets

Pumps and parts

17-3. Explosives.

Powder

Fuse

Caps Electric exploders

17-4. Cement, Etc.

Cement Lime Brick Fire clay

Sewer pipe Sand Rock

Wall plaster

17-5. Lumber and Timber.

Lumber Timber

Slabs Ties

Flat timber Doors and Windows Lagging

Poles

Interior finish

17-6. Machinery.

Engines Boilers

Condensers Air Receivers

Power Metal working machines Crushers Compressors Power Wood working machines

17-7. Pipe and Fittings.

Elbows, tees, crosses, couplings, bushings, pipe, Valves, whistles, traps, gauges, lubricators, etc.

17-8. Oil and Grease.

Lubricating oils

Grease Kerosene and gasolene Candles and Sunshine

Rope dressing Belt dressing

17-9. Electric Supplies

Lamps **Fixtures** Wire

Motors Transformers Telephones

All Electrical supplies

Meters 17-10. Tools.

Machinists hand tools Blacksmiths hand tools Carpenters hand tools

Masons hand tools

Shovels, Picks, Hammers, Jacks, etc.

17-11. Stamp Mill.

All supplies for Mill.

- 18-1. Soft Coal.
- 18-2. Hard Coal.
- 18-3. Blossburg Coal.
- 18-4. Coke.
- 18-5. Family Wood.
- 18-6. Boiler Wood.
- 18-7. Stamp Mill—All fuel.
- 20-1. Loss and Gain on Supplies, Adjustment.—Charge to this account:

Supply Clerks wages Heating System proportion

Electric Light and Power proportion Expense of running supply house Expense of hauling and unloading freight and fuel

Charged off to the various classes of supplies and fuel purchased, by journal entry, from itemized statement on each invoice passing through the supply records. The charge is usually at the rate of 5 per cent. of the purchase price, to cover the cost of handling.

20-2. Manufacturing Supplies.—Charge all labor and material to this account for manufacturing supplies in the shops. Each job has a shop order number.

Credit this account and charge supplies with the cost of finished material when job is completed, this is done by journal entry.

20-3. Hoisting Ropes.—Charge new hoisting ropes to this account and pro-rate out to accounts benefited an equal proportion each month so as to close the account at the end of the calendar year. This distributes the cost of new ropes to the operating accounts evenly over a period of time, instead of having an excessive cost in any one month.

MINE BOOKS-GENERAL ACCOUNTING

The account books for the mine and mill are kept at the mine office, and consist of the following:

Cash book, ruled 5 columns Journal, ruled 3 columns Ledger, loose leaf Side Ledger, loose leaf Check Register Voucher Record Pay-roll Time books Settlement book

Cash Book, Receipts.—All cash receipts when entered in the Cash Book are classified as follows:

the first column, Treasurer.

second column, Accounts Receivable.

third column, Sundry Receipts.

The last column is used to carry the balance and extend totals. At the end of the month summarize your receipts as follows:

Treasurer	••••	• • • • • • • • • • • • • • • • • • • •
Accounts Receivable		
Sundry receipts		

Cash Book, Payments.—All payments are made by check, no cash whatever being paid out, payments are posted to the Cash Book from the Check Register, according to date, and the amounts are classified under the following headings: Labor previous month, Labor current month, Bills Audited previous month, Bills Audited current month, the last column is used for totals and balance.

At the end of the month summarize your payments as follows:

Sundry Labor January	,	• • • • • • • • • •
Sundry Labor February		
Bills Audited January		• • • • • • • • • •
Bills Audited February	• • • • • • • •	
Total Payments		
Balance	31-19	

The amount for the Cash Book entry covering Pay-roll checks issued on pay day is arrived at in the following manner: Deduct from the net amount of the Pay-roll for the month in question, the total amount of settlements issued against that month. Pay-roll checks issued on pay day are not entered in the Check Register.

Journal.—The first entry for the month is Sundry Labor to Sundries itemized which comprise deductions made on the Pay-roll which are to be credited to operating or suspense accounts. In other words it is not necessary to draw checks for them. The sum of these deductions plus the net amount of the pay-roll equals the gross amount of the time books.

The second entry is Sundries to Sundries itemized as follows:

Sundry Labor, pay-roll total, as per Cost Sheet page 0 Shop Accounts, total amounts, as per Cost Sheet page 6 Closed Accounts, total amounts, as per Cost Sheet page 7-7 1/2 Supplies, as per supply summary, total Fuel, as per supply summary, total Bills Audited, as per Voucher Record, total.

From each of the above sheets the details have been posted direct to the proper ledger account. This is a skeleton entry.

The third entry is Sundries to Supply Adjustment Account.

This entry is for the amounts charged to the various classifications of supplies and fuel. It is 5 per cent. of the face of the invoices that have passed through the various classifications during the month, and represent the cost of handling the supplies and feul at the mine. This information is secured from a memo. kept by the clerk showing the distribution according to the various supply classifications of the Handling Charges against each invoice passing to the supply accounts. Another memo. is kept showing the distribution of Freight and Express charges.

The fourth entry is Sundries to Sundries as follows:

Shop Accounts Stamp Mill total, Cost Sheet page 5 Closed Accounts Stamp Mill total Cost Sheet page 6 1/2 Supplies Stamp Mill total Supply Summary Fuel Stamp Mill total Supply Summary.

Misc. entries will follow the above.

The last entry will be General Expenditures to

Surface Expense Office Expense Incidentals Mining Expense Development Transportation Stamping

Ledgers.—In the General ledger will be kept the main and controlling accounts, the sub-accounts will be kept in a side ledger, also shop and closed accounts, that is, accounts that are closed out each month.

Check Register.—Each check issued, except labor checks issued on pay day are entered in this book (Fig. 51). All checks issued, except pay day checks, are signed by the clerk and countersigned by the Superintendent. Pay day checks are signed by the clerk.

The bank account will also be kept in this book.

Voucher Record.—All vouchers are entered in this book (Fig. 52) and the distribution shown to the various supply accounts, Fuel, Office, Incidentals or Misc. charges. The total amount of Vouchers for the month are journalized as per entry No. 2. The totals of the other columns are posted direct to their proper ledger accounts, except the Misc. column from which each item is posted to its proper account. All supplies

In Acc	In Account with								ı	
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				-			CHECK AND	CHECK AND DEPOSIT REGISTER	E018TER
		OHEOKS						,	DEPOSITS	6.
DATE OF CHECK	PAYABLE TO	NUMBER	AMOUNT OF Check I	1 OF	3 1 2	1880	ISSUED FOR	DATE OF DEPOSIT	AMOUNT OF DEPOSIT	BALANGE IN BANK
	Balance or footings brought formand					a a a	Month			
		80	Ē							
		21								
		63								
		63								
				Fig. 51.	51.		İ			

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	OJIBA	WAL MINE	OJIBWAY MINING COMPANY				Record of D	IIIs Andit	Record of Bills Andited, Month of	10			0	
Dete	FAYOR OF	Vocator Lond	On on a literatural record	A regarding to	SCPPLIES	The sell	Wiley Grown [The	Marie Toda	Fast	Ann A	1 And Land American	Aug 1	Bunkries 100't Am't	REMARKS
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11		1	THE PERSON NAMED IN COLUMN TO PERSON NAMED I			THE PERSON NAMED IN								
1														
1														

Fig. 52.

OJIBWAY MINING COMPANY HOUGHTON, MICHIGAN	MPANY To Dr.	(Reserse Side) Number
		Ojibway Mining Company
19 FOR		Amount, \$
		Favor
		190
		DISTRIBUTION OF CHARGES
		GENERAL.
		IRON and STEEL.
		EXPLOSIVES
		There are the same
		MAGHINERT
		PIPE and PITTINGS
		OILS and GREAGE
The above account to correct, and the		KLEGIRIG
expense was incurred for the benefit of	E I	10018
OJIBWAY MINING COMPANT		TOTAL STATE OF THE
Approved for payment	\$in full for the above account.	
		c.
Loting SuperIntendent.		
Clark	SERVICE THE SAME AND AND AND AND AND AND AND AND AND AND	Faid Chack
Please Date and Mgn this Toucher and Return Without Delay.		
	T) - 10	•

fra. 53.

received and all services performed during any one month are charged into that month's accounts.

Vouchers (Fig. 53) are made out in duplicate with invoices attached, and on the reverse side a distribution of the charges is shown corresponding with the entry in the Voucher Record. All Vouchers are signed by the clerk and approved by the Superintendent.

Engaging Labor.—A person seeking employment with the company will naturally apply to the foreman of the department in which he wishes to work; if the applicant is considered favorably and help is required a slip (form 22, Fig. 54) is made out by the foreman and the applicant

Form 22-9-7-1000	
	19
To THE CLERK:	Book No,
Dear Sir:	
The bearer	
.,	Ojibway Mining Co. to begin work
	19
	Foreman

Fig. 54.—Form 22.

sent to the office with it. The clerk will fill out a Pedigree card (form 27, Fig. 55) with all information called for, and submit it to the Superin-

Name:	Oce	cupa.:	Book No.:
Place and Date of Birth			Immigrated
Reads, Writes, Speaks	English.	Married, Single,	Widower.
No. of Children	Sons Born		
Names and Addresses of Nearest Relatives			
Last Employed	How Long		Occupa.
I hereby apply for me	embership under th		ree to abide by its rules
Signature		Date of Appli	cation
Date of Employment		Date of Leaving	

Fig. 55.—Form 27.

tendent for his approval. If the application is approved by the Superintendent the clerk will issue a numbered pay book, and also give him a copy of the Aid Fund rules. Possession of the Pay Book is authority of the foreman for putting the man to work.

The Pedigree cards are filed in a two drawer cabinet, live cards on one side, dead ones the other. Cards of rejected applicants are filed on the dead side, the card is marked rejected. When an employee resigns or is discharged, his card will be marked accordingly and placed in the dead side for future reference.

When an employee resigns or is discharged, his foreman makes out a slip (form 21, Fig. 56) requesting a settlement, which the man will present with his pay book to the timekeeper. The timekeeper will make out a settlement (form 5, Fig. 57). Earnings must be taken from the pay-roll only if for the previous month, and for the current month, from the time book. Deductions will be made for supplies or fuel, also store, board, etc. In issuing settlements, details for the current month only will be shown, for the previous month refer to the Pay-roll When a settlement is issued the timekeeper will turn it over to the clerk.

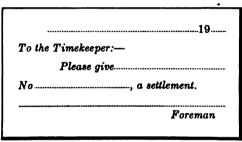


Fig. 56.—Form 21.

All settlements will be entered in the settlement book, Fig. 58. If an employee has time coming for two separate months, it is necessary to make a separate entry in the settlement book for each month.

Time Books and Timekeeping.—Each foreman will keep the time of his men in a pocket time book for reference. The timekeeper will keep the time in a time book ruled for 31 days, of large size. The time of all men employed above ground will be posted to the time book from the Individual Returns (form 12, Fig. 63) which each man is required to make out each day, showing what he has been doing and the time spent on the various jobs. Each foreman must O K the slips of his men before he turns them over to the timekeepers. An explanation of the Job Order system will be found under Division of Labor.

The total time represented by each slip is posted to the credit of the particular employee concerned in the office time book. The amount of money represented by the time worked on each job is entered on the slip by the timekeeper. These amounts are based on the rate of pay for 10 hours' work. Exceptions to this rule are Engineers, Firemen, etc., also foremen on salary. Employees on a salary basis turn in 10 hours a day for each working day. After the time has been posted from the Individual Returns, they are turned over to the clerk having the Distribution of Labor in charge.

The time of all Underground employees is kept by the Shift Bosses in pocket time books, and is reported to the Timekeeper once in 24 hours.

	SETTLEMENT
	To the Clerk of the OJIBWAY MINING CO.
}	at this
	TOTAL CREDIT,
\	# 2 DEDUCTIONS. # 2 Supplies &
	Beard 811
	AMOUNT DUE
-	•••••••••••••••••••••••••••••••••••••••

Fig. 57.—FORM 5.

As miners actually work only five shifts a week, the following rule will be observed in giving them time. A miner who works five shifts in a week will be given credit for six shifts. Miners who do not work the five shifts in a week will receive credit only for the time actually worked.

The timekeeper will classify the labor in the time book in the following order:

×	Captains and Shift Bosses	L	anders Surface
	Miners Company Account	L	anders Underground
×	Miners Contract—each contract separate	X	Engine boys
×	Selectors		Pumpmen
×	Blockholers		Pipemen
×	Wallers		Timbermen
	Trammers	X	Change house men
	Track repairers	X	Sprinkler

Space must be allowed to show a Distribution of Labor of all the above classifications in the time book except those marked thus, \times , which are not distributed.

	Ó	JIBW	OJIBWAY MINING COMPANY. Houghton, Mich.	1 6)MP	LNY.	Hon	gbto	n, M	मुं							
				İ			Ř	ם	Month of						19	ı	
PA TA	MAK	š	MOLENBATION	SALE SALES		L	8 I		DED	DEDUCTIONS	48				AMOUNT	CHECK	
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				ı	Ħ	Fig. 58.						1	•				
			OJIBWAY MINING COMPANY,	WAY	MIN	DNG (OMP	AM									
	NAMES	72.8	EAR	EARNINGS		Н				DEDUCTIONS	TIONS					AMOUNT MO. OF	0
_	NAME CO	e II	Remines and Contracts not Decellane		T T			1			Ī				-	-	

 \times Surface \times Engineering Department

Teams
 Company Teamsters
 Carpenters
 Masons
 Engineers
 Firemen
 Machinists
 Pumpmen
 Blacksmiths
 Rockhouse

× Electricians

Space must be allowed to distribute those classifications not marked with a cross. Those marked with a cross make returns on Individuals Returns.

The time book should be made up as soon after the end of the month as possible, and when proved, a Summary of the Time and Earnings will be made out for each of the classifications as shown above. This Summary should be entered in the time book following the month in question.

Pay-roll.—The Pay-roll, Fig. 59, is made up from the time book. The employees names are entered according to the pay book numbers in numerical order. After posting is completed, check the total against the time book summary for proof. After this is done check all Settlements issued for the month in question, from the Settlement book to the Pay-roll.

Post deductions as follows:

Rents, from the rent cards
Supplies, from the supply sheets
Fuel, from the supply sheets
Doctor, charge as per Aid Fund Rules
Aid Fund, 50 cents for each employee working over three days
Board, as per board bills turned in

Store, as per list of collections sent in. A charge of 2 per cent. of the amount collected is made for this service and 25 cents for each assignment turned over. These collection fees are credited to Office Expense. Also any fees received in connection with Garnishment proceedings.

Misc.—Under this head collect, Labor charges, Electric Light, Collection Fees and sundry items.

Credit the Mine Physician with the total of the Doctor column.

Credit individuals with Board collected as per board bills.

Credit Store with collections as per Store column, post collection fee and assignment charges against this in the sundry column.

Extend Earnings columns, total and prove.

Extend Deductions, total and prove.

Extend Amounts due, total and prove.

When the Pay-roll is completed make a Summary for the month and enter in the Pay-roll as follows:

	Earnings		I	Deductions
	Days	Amount		Amount
Time Book,	XXXX	XXXXX	Rent,	xxxx
Office,	XXX	xxx	Supplies,	xxx
Doctor,		xxx	Fuel,	XXX
Board,		XXX	Doctor,	XXXX
Store,		xxx	Aid Fund,	xxx
			Office Fees,	xx
Total,	XXXX	XXXXXX	Electric Light,	XXX
			Board,	XXXX
			Store,	XXXX
				-
		•	Total,	XXXX

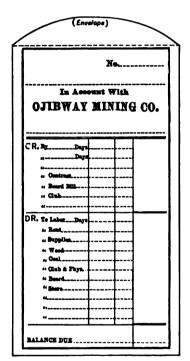


Fig. 60.—Form 4.

It is well to have pay Dockets (form 4, Fig. 60) written as soon as the Pay-roll is completed.

Pay checks should be written the day before pay day, assigned accounts removed, etc. On pay day the dockets should be delivered only to the individual in whose name they are made out, on presentation on pay book with the receipt (Fig. 61) properly signed for the month in question. Dockets will not be delivered to parties other than those in

whose name they appear, only when an oder to that effect properly signed and accompanied by the pay book receipt, also properly signed, is presented at the mine office.

	not be torn off by owner of Book
	Received of
OJIB	WAY MINING CO.
E	Salance Due for labor in
	JANUARY, 19
Number	
Write Name h	ere before presenting Book at Pay- Window

Fra 61

Distribution of Labor.—The Shift Bosses will report each day to the timekeeper, when they report their time, a distribution of labor for all their classifications except,

Captains and Shift Bosses, Miners contract, Change House men, Selectors, Blockholders Sprinkler, Wallers, Engine boys.

This distribution should show for each classification the number of shifts worked in each opening. To illustrate, suppose we have 20 Selectors:

1 shaft	3N-mill	4	3
1	48	3	2
1	4N	2	4
2	38	3	3
2	4N	4	4
Rockhouse	No. 1		2
Tramming	No. 1-31	V-mill 4	1
Tramming	No. 2-41	V 4	1
•			20

which is the total of Selectors as shown by the time book for the day in question. The same idea applies to all the other classifications of labor underground. The timekeeper will show these classifications of labor in his time book immediately following their time.

Distribution of Labor above Ground.—These classifications are as follows:

Surface Blacksmiths
Teaming Electricians
Carpenters Engineering Dept.
Machinists Masons

The distribution of the above classes of labor is made to Job Orders by Individual Returns, Fig. 63.

Engineers—may have to distribute to different plants Firemen—seldom any distribution Pumping—Watersupply—seldom any distribution Rockhouse men—keep different houses separate.

Whenever any distribution is necessary for the above four classes, they will be kept in the time book.

Job Orders.—In an effort to get an efficient and comprehensive cost keeping system the job order method is used, comprising the following forms:

Form 12. Individual Returns
Form 35-A. Job Order issued to foreman
Form 35-B. Job Record, office record
Form 47. Job and Equip. Record, an index to jobs.

OJIBWAY MINING	COMPANY
	JGB No. 1346
	DATE
BLUE PRINT	SKETCH
Time and Supplies Must be Ch	arged to Job Number.
Description of Work:	
Return Duplicate when Job is finished.	Master Mechanic.

Fig. 62.—Form 35-A.

It is well to have the Master Mechanic or his assistant issue job orders as the majority of jobs above ground come under the supervision of the mechanical department. A Job Order will run for a month only (except that jobs covering the manufacture of supplies, will run until the job is completed). If a job is not completed at the end of the month a new job will be issued the first of the month to cover the work, etc., until completed.

Job Orders, Fig. 62, can be issued so as to get as much detail as is

required. Of course, the more detail, the more jobs it is necessary to issue and more time is required to take care of the office work in connection with the system.

A list of the job orders issued each month will be posted up in each of the shops and at the supply house for reference, this should be attended to by the timekeeper on his rounds twice a day. The Job Orders are issued in duplicate, the original going to the mine office, and the duplicate to the foreman having the work in hand.

Employees working on jobs will show on their Individual Return, the Job number and the number of hours worked on the job, this applies to as many jobs as he may work on in a day. As stated under time-keeping, these slips reach the timekeeper through the various foremen. The timekeeper will then extend opposite the various jobs the amount of money, based on the man's day rate of pay.

INDIVIDU	AL RETURN Date		
BOOK NO	NAME		
ЈОВ	NATURE OF WORK	HRS.	COST
		_ _	
This is authority f	or FOREMAN	l'S O. K.	
employee's time.			

Fig. 63.—Form 12.

From the Job Order the clerk or his assistant will make out a Job Record (Fig. 64) noting the Job number, the work it covers, and will also show to what account the work is to be charged. When jobs are completed they are indexed on 5×8 cards like the following (Fig. 65). This card answers two purposes. First as an index to jobs and second to show details of Equipment. Regarding equipment the card would show the item, which might be a Motor, Boiler, Compressor, Air Drill, etc., and the details, also From whom bought, Voucher number, Cost, Freight, Handling. Charged to what account and when. To illustrate the use of the card, if we had a job to repair Compressor No. 1 and were indexing,

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Job Order No.	Account of							١١	١										
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	Me	Tumbe Ourponters Machinists Bentumblide Beetriefens Lagr. Dupt.	Dare The description describing describing describing describing describing the describing							8	# C			Expens		Poppilies	744	Amount	

Fig. 64.—Form 35-B.

turn to Compressor No. 1 card in the file, post the job number, the month and the cost of the job.

All Equipment should be indexed on these cards for ready reference. The Job Records are made up at the end of the month, and as soon as the books are balanced and cost sheets are made out the shop expense and supplies can be posted to the Job Records to make them complete before indexing. Before the books can be made up it is necessary to transfer the jobs to Division of Labor sheets (a sheet for each shop) these sheets have the following headings:

Account Number, Account, Time, Total Cost, Labor, Expense, Job No., Remarks.

Equi	pment	Record	Subje	ct			 			No.	
From					Desc	ription					
Youc	her									-	
Cost			Chgd. t	0							
Frt.			Date								
Hdl.			Chgd. t	0							
Total			Date				 				
Job	Date		Amt.	Job	Date		Amt.	Job	Date		Amt
							 	!			
	1 1		1	1		1		•	1		l .

Fig. 65.—FORM 47.

First enter the Account number, then the Account to which the job is to be charged, then the Time, next the Labor, Job number, and last under Remarks state what the work was, as Sharpening Drills for No. 1 shaft.

When all the Labor sheets are made out we are now ready to close the accounts and find the expense to apportion against the different jobs. The expenses of the different departments are apportioned to the jobs of that department according to the amount of the labor charge.

Close out the accounts in the following order, Surface, Teaming, Carpenters, Machinists, Blacksmiths, Electricians, Engineering Dept. and Masons. From these labor sheets post the expense to the different job records for the month, and from the Supply records, the Supplies and the Job Records will be complete.

Supply Department. The Purchase of Supplies.—To facilitate the ordering of supplies the heads of the various departments are furnished with Department Requisitions, form 14-A, Fig. 66, as shown below.

DESCRIPTION		Req. No
DESCRIPTION	STOCK	CHADCEADIE TO
		CHARGEABLE TO
		Foreman

Fig. 66.—Form 14-A.

	-	isition for			No
To The Cle					
Ple	ease furnish the f	ollowing art	icies, for us	se as speci	fied:
Amt.	Articles	Charge- able to	Cost of New Order	Amount on Hand	Order No.
		<u> </u>			
		_			
			1		
		=			
-					
-					
- Dated	19		A pproved		19
	19Foreman		A pproved		

Fig. 67.—Form 2.

The heads of departments will order supplies on these forms for specific jobs, and only such material as is not carried regularly in stock in the warehouse. They must be signed by the foreman issuing the same and turned over to the Mine Clerk; they will also be approved by the Superintendent before being ordered by the clerk.

Requisitions on Purchasing Agent.—These requisitions (form 2, Fig. 67) are made out in duplicate by the Mine Clerk, either for the purpose of filling depleted warehouse stock, or specific jobs as per Department Requisitions, and must have the approval of the Superintendent before going to the Purchasing Agent. If supplies are ordered from a Department Requisition, its number should be noted, also the foreman's initials at the top as reference. The original copy goes to the purchasing agent and the duplicate on file.

Form 14	-3 M-1-10	for			No
From	•••••••••		•	Order	· No
Amt.	Req.	Description	List	Dis.	Net
	<u> </u>				
Ship					

Fig. 68.—Form 14-B.

Office Orders.—To handle the work in the purchasing office to the best advantage, the purchasing agent makes out from the Requisition, Office Orders (form 14-B, Fig. 68) which are turned over to the stenographer to execute. The Requisition number is shown on the Office Order for reference.

Purchase Orders.—These orders (form 1, Fig. 69) are made out in triplicate by the stenographer, from Office Orders. Original copy goes to the Vendor, Duplicate copy to the files, Triplicate copy to the mine office.

DJIBWAY MI L. L. HUBB A. FORMIS, 8	E OF THE NING COMPANY ARD, PRESIDENT UPERINTENDENT RITON, CLERK	Please	nal Order No note our order er on each invoid	
MINE ADDRES	8: OJIBWAY, MICH.	Houghton.	Mich.	101
	the Ojibway Mining Co., icate with Bill of Lading	the following	material, vis.,	
Amount	Description	List	Discount	
$\widetilde{}$			$\widetilde{\top}$	
Ship via {		Ojibway Mi	ning Company	
	way Mining Company	Ву	******************************	Clerk

Fig. 69.—Form 1.

Freight Received Record.—All freight and express received at the mine will be entered in this book (Fig. 70). Freight bills must not be receipted by the supply clerk unless material called for is received and in good order. In the event of material received, being damaged, a notation to that effect must be made on the freight bill, also in the Freight Received Record, and the same reported to the mine clerk. Endorse on each freight bill the purchase order number that is effected. In the case of shortage or damaged material, this should be noted on the freight bill, also see that the R. R. agent is advised as well as the mine clerk. Make a notation in the Freight Received Record in case of short or damaged goods.

	nber	Pr	m.	<u>.</u>	oint				c	harge	8	
	Order Number			Consignor	Original point of Shipment	Via	Articles	Weight	Advance	ۊ	aid	Remarks
	ord	No.	Date	රි	Orig of S		•	^	Adv	Local	Prepaid	
- -											-	
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- -								_				
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Fig. 70.

Invoices.—All invoices are received in duplicate by the Purchasing Agent. They are dated and stamped like Fig. 71.

Rec'd		
1		
2		
3		
4		
5		
6		
•		
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ppiov		

Fig. 71.

The numbers representing the different classes of supplies. Each invoice is checked off against the Purchase Order. The items on the order being checked off and the price noted thereon, also the date of the invoice, terms of payment and the F. O. B. point. The price should now be checked either against quotation received or prices previously paid for the same goods. Extensions and footings must be verified and cash discounts figured. All invoices after being checked should be entered on the Price Record cards (form 8, Fig. 72). A separate card being used for each item or kind of article purchased, Fig. 72, form 8-5×8.

rticle								t Class
DATE	FIRM	ORDER	QUANTITY	PRICE	DISCOUNT	TERMS	F.O.B.	REMARKS
			ļ				├ ──├	
			<u> </u>		↓ ↓		L	

Fig. 72.—FORM 8.

These cards furnish a complete record to the Purchasing Agent of prices paid and quantities purchased.

Invoices should be forwarded to the mine office each day, and when received by the clerk, the duplicate placed on file and the original turned over to the supply clerk.

The supply clerk will check the invoices against the triplicate copy of Purchase Order. When material received is checked off, he will also show against each item on the invoice, its proper proportion of the freight charges on the shipment, and also to each item 5 per cent. of its cost to cover the expense of handling. The supply clerk will O. K. all invoices for receipt of material and they will have to be approved by the Superintendent before being paid.

Cash discounts should be taken in every instance. Pay all invoices (except discounted ones) on the 15th of the month following receipt of goods or performance of services.

Stock Record Cards.—For the purpose of keeping an accurate account at the mine of all supplies purchased and also used, form 7, Fig. 73, is an example of the card system used. The supply clerk will keep a separate card for each article or kind of material bought. From each invoice received each item will be entered on its proper card, showing date of invoice, Purchase order number, Quantity, Invoice cost, Handling, Freight, and Total Cost. The price at which articles will be charged out, is arrived at by dividing the total cost by the quantity received All supplies charged out will be entered on the proper cards by the supply

clerk, from the supply orders (form 3, Fig. 75), showing Date of charge, Account chargeable, Quantity and Amount.

At the end of the month after all invoices and supply orders have been entered on the cards for the month, the cards should be balanced, and the quantity on hand and value brought down as of the first of the month. From this balance of quantity a value will be figured, the new charging price for the coming month.

rticle								Classifica	ıtion		
DATE	CONSIGNOR	QUAN.	0087	HAND'	P'OHT.	AMOUNT	DATE	ACCOUNT	QUAN.	PRICE	AMOUN
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Fig. 73.—Form 7.

These cards should be filed in alphabetical order, with subguides for the various kinds of material. For instance, Bolts would come under the letter B, and separate guides should be provided for each kind of bolts.

The Purchasing Agent keeps a duplicate record of all supplies purchased and used or sold. This record can be kept as a loose leaf book to advantage. It is kept primarily as a guard against fire and the loss of the mine records, it also serves as a check on the supply clerk. A copy of this sheet (form 39, Fig. 74) is shown.

Supplies Used Record.—Supplies will be issued by the Mine Clerk only on presentation of a "Supply Order" (Fig. 75) properly signed by the head of the department ordering the same, or such persons as are authorized by the Superintendent to sign Supply Orders. From day to day these orders should be entered on the Supply Stock cards, and at the same time the entry is made, the value of the quantity of goods being charged out should be noted on the Supply Order.

There will arise at different times cases where supplies that have been charged out, have served their purpose and are not required on the job they were originally charged to, but are removed and are in condition to be used for some other purpose. To meet this condition we use a Credit Slip (form 38, Fig. 76), giving the job the supplies were originally charged to credit, and charging the material back into the supply account. Or in a case where material is removed from one job to be used on another, the first job would receive credit and the charge would be to the second one.

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NOW RECEIVED	1	E	0				+	+	+			Н	H							E
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FYIOM		ó				-	4	+	+	-		H.	F							
FYIOM			0.8	1			1	1	1			1								
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Fig. 74.—FORM 39.

SUPPLY CLERI	K:	Deliver th	e following materi	al to
Amount Ordered			Value	Chargeable to
1				

Fig. 75.—Form 3.

Concrete work is an instance where lumber is used for forms and is removed when the concrete is set. A large part of this lumber is in condition to be used again for other purposes and credit should be given the job it was charged to, and the lumber charged back into the supply account at such a price as it would be worth in future work. They are handled the same as Supply Orders.

PPLY CLERK:		190
Amount	Value	Credit

Fig. 76.—Form 38.

Supply Orders and Credit Slips after being priced are posted to the Supplies Used Records for the month (form 28, Fig. 77). These sheets will be laid out and kept to show the details of accounts as noted below, and all Supply Orders will have to show to what sub-division of the account supplies should go.

\mathbf{T}	General	Irus & Steel	Baplonires	Com. Brief red	Lumbar Timbur	Machinery	MONTH PhotFitting (II)	a. Greene etd	Biéntie	Tuest	TOTAL For
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E		1.911									
E				11111				- 1111		- 111	1 1111
E											1101
E	1 111	1 11/1 1	1.10	1 1111	1.00		DIE	11111	THE		
Ξ											

Fig. 77.—Form 28.

Supplies charged to construction must show the different subdivisions as per construction schedule. Supplies charged to other accounts must give information called for in the following schedule.

Shaft Sinking	Show shaft number.
Shaft Construction	
Plats	Show shaft number and level.
Crosscuts	Show shaft number, level and place.
Raises	Show shaft number, level and place.
Winzes	Show shaft number, level and place.
Drifts	Show shaft number, level and place.
Diamond Drilling	Show hole number.
Stoping	Show shaft number, level and stope number.
Steam Plant	Show operation, building repairs, condenser, pipe lines, stack, boiler repairs.
Elect. Lt. and Power	Show generating plant, transmission lines, telephones and
	lines, lamps.
Compressor	Show building, compressor, each separate.
	Show Shaft number and opening, drill No.
	Show Shaft number and opening.
	Show Shaft number and opening.
	Show Shaft number and opening.
U. G. Cars	Show Shaft number and opening.
Hoisting	Show building, engine, ropes, pulley stands, skips.
Pumping	Show Shaft number, level, pump number, pipe lines.
Rock House	Show building, machinery, Poor rock trestle.
Timbering	Show shaft number and opening.
	Show building, pumps, hydrants and pipe lines.
Co. Team Account	Show building, equip., repairs, operating.
Rents	Show House number.
Shop Accounts	Show building, operating.
Mill accounts	Show Head number.

These Supplies Used sheets will be summarized at the end of the month on a sheet for that purpose, showing each account to which supplies

are charged, and the amount of supplies and fuel charged, subdivided into the various classifications. The classification columns are totaled, and then cross-footed. The totals of the classification columns are posted as credits to the Supply Accounts, and the charges to the proper account in the ledger. See journal entry No. 2.

Claims for overcharge, loss, or damage of goods in transit should be made promptly by the Mine Clerk. For this purpose use form No. 33 (Fig. 78).

	Our No			
Dr. to				
No. of Car Shipped by Weight Charged Rate Charged Amt. Frt. Paid II Initials of Car or Bost From Weight Should be. Rate Should be Amt. Should be I No. of Way Bill Shipped at Date of Way Bill At. Sundry Lesses	Ami, of Claim	Anst. Paid	Date Pai	
REMARES: Claims Attached. We Credit Amount Collected to				

Fig. 78.—Form 33.

All claims should be made out in duplicate, retaining a copy for reference until the matter is adjusted. The claim should receive the same number as the Purchase order effected.

Rental of Equipment.—The company will at times rent equipment, such as portable hoists, boilers, derricks, pumps, etc. To properly handle the expense and rentals in cases of this kind the following rules will be observed. Any expense incurred for overhauling and repairing also loading on cars any equipment for rental to outside parties will be charged to surface expense. The renting parties will pay freight both ways on any equipment rented. All rentals received will be credited to surface expense.

As a proper rate of rent is somewhat hard to determine, the following rule will be helpful. From the first cost of the equipment in question take the accepted yearly per cent. of depreciation and divide by 12 to get the monthly rental. The result of this rule can be used as a minimum

	OJIBWA	Y, MICH.			No	
		DAII	LY REPO	ORT		
For t	he 24 hours	beginning	at 7 a. m.		•••••	19
	RO	ск ноізт	ED		SHIPPED	
	Good	Waste	Total	Rock		Mass
Skips					Cars	
Tons		1			Tons	
Coal 1	Jsed		Cons Saro?	Wood Used	·	
		DRI	LLS AT WO)RK		
Sinking 1	Sinking 2	Drifting	Stoping	Raises	Winzes	Other
		M	OW TA NE	R.K.		
Sur	face Depart	ment	Unde	rground De	partment	
Surface For	eman		Captain			
" Lal	oor		Shift Bos			
Watchman			Trammer	Bosses		_'
Janitor			Miners			_'
Carpenter I	oreman		Drift			_¦
Carpenters			_	cutting on Pillars		_
Master Med Machinists	nanic	——-¦—	_	Stoping		_
Macninists Blacksmith			Stop			
Masons		¦	_! ! 	ting Side		_
Electrician			Rais			_
Engineering	g Dept.		Wins	166 1		
			Sink	ing		_
Engineers			Timberm	en		
Firemen			Trammer	8		
Pumpmen		!	Muckers			
			Landers Wallers			_
Rock Hous	e		Pumpmer			_
Foremen		_	Pipemen	1		-
Landers			Pony Boy			-
	ssistant, Of	fice	Drill Boy			
Timckeeper			Dry Men		-	-
Supply Cler			-			_
			Total Un	derground		
			Add Surf	B.Ce		-
			Total			

Fig. 79.—Form 15.

rate to which should be added an amount sufficiently large to cover the cost of loading and unloading.

Reports.—A Daily Report (form 15, Fig. 79) is made out each day by the timekeeper and sent to the Superintendent. This report shows the men at work under the different labor classifications, the Drill at work, Fuel used, and Rock hoisted and shipped.

	<u>-</u>	No
	OJIBWA	Y MINING COMPANY
	ACCI	IDENT REPORT
	-	Shaft No. —————Pay Book ——————————————————————————————————
4. Day and hour w 5. Were you prese	hen accident occurr nt?Give you	the work? ed
Name	Occupation	P. O. Address
7. Statements of	witnesses	
S Statement of a	marks of lained as	Top. Does he blame any other than bimself?
o. statement of re	marks of injured per	Reported by
Dated at		

Fig. 80.—Form 37.

Accident Reports.—In any case where an accident occurs to any employee of the company while performing his duties, an Accident report (form 37, Fig. 80) must be made out in duplicate by the head of the department in which the injured man is employed. This report must give the fullest possible details regarding the accident, statement of witnesses, etc. The original copy goes to the Supt. and the duplicate to the Mine clerk.

Development Report.—The progress of work underground for the month is reported by the Engineering Dept (Fig. 81). This report is a cumulative one for the year, being added to each month and furnished as a blueprint. A copy goes to the Superintendent and one to the Mine clerk, for use in making up the cost sheets.

Progress measurements underground are made by the Engineering Department jointly with the Mine Captain.

This report will show the Lineal Feet, Cubic Feet, and Tons broken for each active opening during the month.

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Fig. 81.

Nationality Report.—(Form 45, Fig. 82). A report showing the Nationality of the various employees of the company will be made out by the Mine clerk from the Pedigree cards quarterly, April 1st, July 1st, October 1st, and January 1st. One copy goes to the General Manager and one to the Superintendent.

Comparative Cost Statement.—This report is made out after the cost sheet is completed and forwarded to the Superintendent.

Cost Sheets (Figs. 84 to 97 inclusive).—The Cost Sheets should be made up as soon after the first of the month as possible. Send one copy to the General Manager and one copy to the Superintendent.

The Mine Captain should be furnished with a copy of the Stoping sheet and also the Development sheet as soon as completed, the Master Mechanic with a copy of the Machine Shop and the Blacksmith Shop accounts, the Carpenter foreman with a copy of the Carpenter account, the Surface foreman with a copy of the Co. Team Account, Surface Account and Teaming Account.

			ION		11.	REP	UK.	r.			Date	·,				•••••	19	• • •
	Miners	Trammers	Other	Office	Rock House	Surface	· Teamsters	Carpenters	Machinists	Smiths	Electricians	Mason	Engineer Dept.	Engineers	Firemen	Railroad	Mill	TOTAL
American	1-	_			_		_			_	_	_	_		_	_		-
English													_	_				
Finns															_	_		-
Swede				_								_		_			_	i –
Norwegian			_							_				<u> </u>		_	_	
Austrian	_				_						_				_			_
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Slavonian	_, _	_		_			<u> </u>						_				_	
Bulgarian						!	_			_	·		_	_		<u> </u>	_	_
Roumanian	-	_			_	_	_	_	_	_						_		_
Totals		_	i		 						_	_	_		_	_	— 	

Fig. 82.—Form 45.

The Stamp Mill Superintendent should be furnished with a copy of the cost sheet covering Mill operations.

In making up the Cost Sheet, Figs. 84, 88, 89, 90, 91, 92 are used as Journal vouchers, the debits and credits being posted direct to the ledgers. Skeleton entries are made in the Journal to cover the total of each sheet. Fig. 84 is made up first, a distribution of labor as shown by the time books, and posted to the ledger. Figs. 90, 91, 92 are made up together, this is necessary as the accounts are interwoven. Figs. 88 and 89 are made up together, and then the balance of the sheets follow.

The same form sheet as Fig. 94 is used for mining expense.

COMPARAT	rive cos	3TS 1	Month of		
Total Men employed		М	en employ	red underground	
	Amount	Total cost per man	Cost per man U. G.		Total Expense
Surface Office Incidental Transportation				Surface accounts	s
Stamping Miners labor Miners supplies Compressor Air Lines				Surface accounts	3
Power Drills Gen. U. G. Expense Pumping U. G. Timbering Tramming					
U. G. Cars U. G. Tracks Hoisting Rock house				U. G. accounts	\$
Construction				Construction Total Expenditure	\$ \$
Total Expenditure Total Men	per	month.		rpenditure derground = \$p	er month.

Fig. 83.

					Summ	ary of	Labo	Summary of Labor as Per Pay Roll. Month of	r Pay	Roll.	Mont	h of											
		MINERR	2	TRAS	KMERS	SELECT	3	TRAMMERS SELECTORS BLOOKHOLERS	_3		RIBO	Г	PREMER		BHOPE	 		H	OFFICE	_	TOTAL	Г	Lodger
		Days .	Amount	Deye	Amount	Days Am	ount D	Days Amount Da	nt Day	Amount	Days	Amount	Days Am	June I	ays Am	runt De	Vs Amo	ant D	ys Am	ount D.	ys Am		Polls
1-1	Holm No. 1		F			H	E		L			F	L	Ħ	H			Н	H	H	H	H	
1-2	Holot No. 8		F			H	F		L				H	F	H	H	Ц		Н	Н	Н	Ħ	
8-1	Rockbouse No. 1					H	H		L			F	Н	H	Н	H	Н		Н		H	H	
8-8	Beekhouse No. 8					H							Н		Ц								
l tt	Burface				F	\vdash	F	F	L				H	H	L	H	L		Н	H	Ц		
13-1	Office, Mine	_			F	H							Н		Н		Н		Ч		H		
]-:I	Office, Houghton				F	-			_			F	H	H	Н		H	Н	H		H	H	
0-1	Teaming					H	H			H									Н		Н		
8-0	Ourpenters					L	F		L	L			L	_	H				H		Ц		
8-0	Machinists					\vdash	-					F			Н		Н		Н		Ц		
1-0	Blacksmiths		L		F	-	H					F	Ц		Ц					_	H		
9-0	Electricians				F	H	F		L				L		Н				L				
9-0	Eng. Dept.					H							Н	H	Ц		Н	Н	H	H	H	H	
0-1	Жыны		H			-							H		Ц		Н	Н	Н	Н	Н		
01-10	Steam Plant No. 1		H			L	F		L			F	H	F					Н		Н		
1-10	0-14 Electric Light & Power					\vdash	H	H	L	L			H		L				Н				
0-15	0-15 Compressor		L			H	H			L	Ц	F	L	H	H	H	L	Н	Н		Н	H	
0-17	0-17 Power Drills		H			Н		H		Ц			Н		Ц				Н		\parallel		
0-18	0- 18 Water Supply														Н		4		\parallel				
0-19	0-19 Heating Bratem												Н						Н		\dashv		
0-30 Rents	Rents					H		Ц							Ц		4		\parallel		-	7	
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18-1	Buppilee					H	L												Н		4		
11	Ald Pund		Н			H									Н						+		
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Fig. 84.

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		no fording one					1							
N	OCCUPATION	26	WORKED	KAHNED	RATE	AVER'G PER PER LAILL BATE WE'N SHIPT	ıt.		14	LABOR	SUPPLIES	OTHER	TOTAL FOR MONTE	TEAR TO DATE
	SOLUTION							Mining Expense						
11	Clerk.						1	Transportation						
П	Stonegrapher							Bianulus	Ĭ					
	Employ Onell						f	Buthes	I			#		İ
П	Mining forgrams and Art It						Ì	Office	I					
П	UNDERBOUND							Indidutals						
	Mining Contain						H							
	Mass on Contrast								Ī		1			
	Master on Ga. Astronal						1		I					
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	Vallars						t							
	Track Hepaits													
	Lanter, U.O.													
11	Panghaen						1							
	Underground Laborers Co. Acet						1	Total Operating Expense						
	Timbertoen and Assistants							Development						
	TOTAL							Constitution of						
11							Ħ	Delerral Accounts						
П	BURLACK						H							
	Surface Forum an						Ħ	Total Reproditutes						
	Watchuren	-					H		Ĭ					
1	Teacher						İ		Ī	1	-			
П	Carpender Lorenses						Ħ	Tont Real Stammed	I					
	Master Mechanic						İ	Paul Mises Projuced						
П	Machemith Foreman							Total Product in Pounds						
П	Hackaniths and Helpers						Ħ	Pounds Minetal per ten stamped	I					
1	Mannand Balpere	1				-	1	Pagada Refined Copper	ļ		-			
П	Englishers in Congresser							Pounds Refined Copper par ton stem	700					
	Fireman Laborers							Cost per ten stamped, Bunning Exp.	8					
						-	T	11 11 11			1			Ī
							İ	Staking No. 1 Shaft						
							Ħ	Drifting No.18haft						
11							Ħ	Blee and Where No. 1 Shall	I	-				
		-						Men Employed						
		-					1		Ī					
	TOTAL													
		+												
Ш										1				
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							Incidental Per Start Mee Meets Man per In. P. Expense Ton Miss Miles Miss Miss Miss Missel Mi								AVERAGE WACKA	Phumped Mes Under Mes Surfre Mes All						
th of Karanes Machine Pende							Burface Per Office Per Ton Ton				-				POOR ROOK Per Gend	Redred From R. S. Benk			-			
Month of Monte of Active o							Transport- Per Beamping Per ation I'es				-					THE AN HOUSTED	For'd	July		Nor.		
Total Labor Accorded	Parish City						Rock House Ton								AVERAGE WAGER	Blamped Mes All Dader Surhe Mes						
ing Ossatrucion, Development							Per Releting Per Ton								POOR BOOK PerCond	Retroit From R. L. Lond						
Total Reality	Jes.	Pek	March	re O	Nov.	Рес	Mining	Jen		March		36	Nor.	A		BOISTED		4		May	outh?	

Fig. 86.

Fig. 87.

		STEAN	STKAM PLANTS	_	TIIIClosed Ac		2 2	S F	Mill—Closed Accounts.		Month of	ఠ	MODUD OF	L	3108	1	Tables & Young	- 17	CONVEYOR	LABORATORY	TORY	TOTAL	
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	BUKFAGE	TEAMING	CARPENTERS	MACHINISTS	SMITHS	RECTRICIANE		ENG. DEPT.	N	MABONS					TOTAL	7
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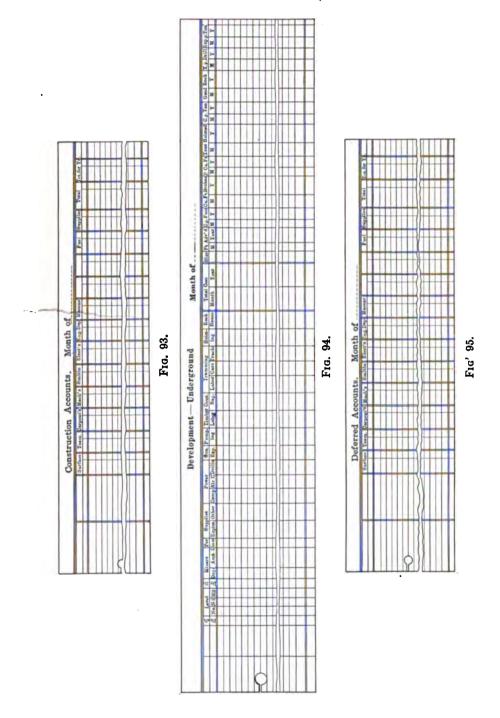
Frg. 90.

I STRAM PLANTS	STEAM PLANTS IN	P. BO LIGHT & POW. I	WATER SUPPLY	WATER SUPPLY BEATING SYSTEM CO. TEA	2		RENTS	CLEARING LAND	D RIGHWAYS	TOTAL	Ledger
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N man		100	100								
Other Staplism		er Supplies	Other Supplies			-					
OPER. EXPENSE											
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			Machinists								
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Cot per Ton Bolts.		t	Gal, Pumpel		Lord par Hopen	BERT'L VAL.	VAL.				
Ton Roist p.T. Chat.		Court Operation	Cont. Opera Box.			Vacant.					Ц

Fig. 91.

TOTAL																																		
ROCK HOUSE Day Aux	44 100 100	abor		4 to 0 and 1	ORIN		NOTHRAFT	Labor	0 1 to Day	ONIN		NO.1 SUAF							MO,2 BHAPT										Ku.l. Tena	aint to 6	No.2 Tone	Open per Ulin	Total Tuni	
HOISTING Devil Ame	3		Landara			PT.			Steam Page				Wachinist	Smiths	Supplies	Puller Stands	NORBHATT	Marbinists		Spiroline	Nip.	MIST STATES									No.2-Toba		Total Ton	
U.O.TRACKS						Rails																												
D. G. CARS		-	1									CAR HERS	Machinist	Beniths					Buppiller															
THAMMING		Learning				applies							-	a					99					its					Na, Lone	Par Ton 141 Pa	No.T. Tons	Lper Ton	Ton 10 Pe	
TIMBERING-CONC.		Umberman Vocasia	Surface	1	DESCRIPTION OF THE PARTY OF THE	90	Aggina .	Stalle	or ment	Olive Supplier													4	Accounts Credits					N. C.	Pare	N.	Con	Par	
PUMPING		COLUMN TO STATE OF		1	I				The state of the s			NOTBILA	Smith		Supplies.		NOZEHAT	Machinist	Significan		Buggline			Closed Acc					No.1 United	Major III	No.2 Gallera	Operated 100	Maint or Main	LOCAL WHITE PARTY AND ADDRESS OF THE PARTY AND
OEN.U.G.EXPEN.		Captain State		1		DRY			anitor .			DAY																						
POWER DRILLS GEN.U.O. EXPEN.		White Land of the Real of the Land of the		Leaning		March							Standard Standard	Dell Chee		DEST. PACE	Machinists	Hackenii o	Drill Paris		Daluer Bopplies								Days Worlod	Cont. per 1787	Now March Day	er Del'ab.Der	re'l Marth Day	
AIR LINES		PRINCE		Sqrfaor L	96	×		Other Supples					Chemen.			a l	×		0		Phys. R. Pith's Oc.						I		90	0.5	N	X	4	
COMPRESSOR 1			Water Bupply	ent figurates	Establish Park			000	Aber Distalled		OPERATION	-	Machinist		Zupillet.							Ma mismande	Local Engelose				1	Lotte Ores	Can. Prom Ale	out pre 101 PA	Cont Operation			

Fig. 92.



COST Drill Statt Treat Brists		Supply	Ac	count, Mont	th of	
TUTTON	+0+++					
Sin	181111		T	Balance	Individuals	
Day	181111			Supply Clerk	Supply Distribution	
8 8	TIME			Labor		
Tous	13/11/11			Purchases		
	+11+11+1		-	Manufactured		
Shifts	134111		-	Transferred		
	1381111					
DAYS			-			
			-			
TOTAL	1531111		+		Balamer Consists of	
2	1231111		-		Iron and Steel Explosives	
	13.8 1 1				Esphosives	
	18/11/1		-		Comond ato	
LABOR	1331111				Lumber Machinety P and P	
1.5	118 1 1				Olla, etc.	
	1311111		-		Electric. Tools	
83	15 8 1 1 1 1				Tools	
BUPPLIES	1801111		-			
8	13 8 1 1 1 1					
n	13/11/11				Balance	
STOPING STOPING SUPPLIES LABOR	RULL		-		Fuel Account	
NG Ath	1)		-	Balance	Individuals	
Tigo St.				Labor	Sundry Distribution	
5 5	13 (1111)			Service Services	Sumity Distribution	
	18/11/11		-	Purchasus		
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0 8	18311111					
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2	13 (11111					
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Assessed	45 / 1111				Hard Wood	
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Fig. 96.

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			Stamping	
	Cash Account		Sariose	
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	Paymont		Construction	
			Desilogment.	
	— Bundry Leberers		Fuel	
	(In) some		Bapplies	
	Balance as fallows: Chook Hopk		Texas Capaid	
	Drame		Deferred Accounts	
			Accounts Receivable	
	Memorandum Bank Account		Partule Moulinety and Liquipment	
	Checks Quantabling			
	Check Book Balance			
	Unit Balance			
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Fig. 97.

CHAPTER III

MINING COPPER ORE.

ACCOUNTING FRATURES OF THE UTAH CONSOLIDATED MINING COMPANY

In the Bingham Mining District of Utah, the ore bodies are found as irregular replacements in limestone.

The ores of the district contain values in Copper, Gold, Silver, Lead and Zinc.

At the present time the commercial activity of the camp is centered on the Copper-Iron Sulphide ores mainly, with Lead-Silver Sulphides receiving second consideration.

The Highland Boy mine of the company is opened with five tunnels, driven into the mountain at as many levels, along the strike of the outcrop. These tunnels are connected by both vertical and inclined shafts, equipped with ladderways and ore chutes, to facilitate underground operations.

Drifts and Cross-cuts are runs into the ore bodies at convenient places from the different tunnels. The ore is broken down in the stopes with the aid of Machine Drills actuated by steam power. The ore is then chuted down to the lowest tunnel level and loaded into tram cars to be run out to the Head-House in trains of ten cars each, where it is loaded into the buckets of an aerial tram for transportation about two miles down the canyon to the railroad, to be shipped to the smelter for treatment.

The Utah Consolidated Mining Company uses the graphic system of recording data. This graphic method soon indicates the points that must be specially investigated and as a consequence the use of graphic methods has been attended by a steady increase in the amount of detailed information gathered.

While the system is quite comprehensive and takes in many ramifications of the work, as will be seen when the details are given, still the introduction has been so timed that the men gradually accustomed themselves to the system and the extensions have been so logical that no trouble has arisen. Besides, while the work as will be seen covers much detail, the gathering of the detailed information and the methods of recording it in tables have been so simplified that the plotting and tabulating is done by two men who keep up the details of the geology in the stopes as well as planning and looking after all development work and inspecting the principal stopes each day for changes in geology. In

a mine consisting of a series of irregular ore shoots in a fractured and dislocated country the amount of geological work is necessarily quite large.

Of course this matter of keeping track of details can be carried to an extreme, and might possibly become more of a detriment than an aid, were it not that the graphic method soon indicated the important points to watch in each operation and what details may well be omitted as the system is extended.

In order to keep the graphic records it is necessary for several men to collect the data that is used in preparing them. To render this easier and to simplify the work as well as to have the records uniform, practically everything is recorded on printed forms.

MINE LEDGERS-OPERATING ACCOUNTS

	Distribute	Machine Shop
Expense Accounts	Closed Accounts	Shop Accounts
Exploring Development Shafts and Tunnels Stoping Tramming Hoisting Pumping Timbering Cars and Tracks Operating Tramway New Tramway Machinery Laboratory and Eng. Dept. Surface Expense Buildings and Fixtures	Boilers Compressor Electric Lights Heating Fuel Explosives Lumber and Timber Teaming Timber Supplies Surface Waste General Office	Blacksmith Shop

Exploring.—This account is intended to cover all cost, including labor and supplies incident to exploring new ground.

Development.—This account is intended to cover all cost including labor and supplies incident to the development of known ore bodies.

Shafts and Tunnels.—This account is intended to cover all cost, including labor and supplies, in the sinking of new shafts and the driving of new drifts.

Stoping.—This account is intended to cover the total cost including labor and supplies of breaking ore in stopes.

Tramming.—This account is intended to cover all cost including labor, supplies and power, for tramming by hand and by power.

Hoisting.—This account is intended to cover all cost including labor, supplies and power, to operate and maintain both engine houses, hoists, pulley stands, etc.

Pumping.—This account is intended to cover all cost including labor supplies and power, to operate and maintain all pumps and water lines underground.

Timbering.—This account is intended to cover all cost of handling, framing and placing in the mine all timber used underground. It does not include the cost of the timber used.

Cars and Tracks.—This account is intended to cover the cost and installation of new cars and permanent track, but does not include the cost of replacing old cars with new ones.

Operating Tramway.—This account is intended to cover all cost including labor and supplies of operating and maintaining the tramway.

New Tramway.—This account is intended to cover all cost including labor and supplies of building new tramways and trestles, but not repairs to old ones.

Machinery.—This account is intended to cover all cost including labor and supplies to cover the purchase and installation of new machinery.

Laboratory and Eng. Dept.—This account is intended to cover all cost including labor and supplies for running the laboratory and doing all engineering work.

Surface Expense.—This account is intended to cover all cost including labor and supplies of odd jobs about the property that cannot legitimately be charged to other operating accounts.

Buildings and Fixtures.—This account is intended to cover all cost of new buildings and fixtures, but does not include the upkeep of old buildings.

General Expense.—This account is intended to cover all cost of odd jobs underground.

Boilers.—This account is intended to cover the cost of operating and maintaining the boiler plant. It is closed out each month to the various accounts benefited on a basis of horse power used.

Compressor.—This account is intended to cover the cost of operating and maintaining the compressor plant. It is closed out each month to the various accounts benefited on a basis of quantity of air used.

Electric Lights.—This account is intended to cover the cost of operating and maintaining the electric generating plant. It is closed out to the various accounts benefited on a basis of current used.

Heating.—This account is intended to cover all cost of operating and

maintaining the heating plant. It is closed out each month to the various accounts benefited.

Fuel.—This account is intended to cover all cost of coalincluding freight and unloading charges. It is closed out to the accounts benefited on a basis of tons used.

Explosives.—This account is intended to cover the cost of explosives and is closed out each month on a basis of power used.

Lumber and Timber.—This account is intended to cover the cost of Lumber and Timber also wedges and mine ladders used. It is closed out each month to the various accounts benefited according to the cost of supplies used.

Teaming Timber.—This account is intended to cover the cost of teaming timber to the mine shafts. Labor charges only. It is closed out each month to the various accounts benefited on a basis of supplies used.

Supplies.—This account is intended to cover the cost of all supplies used not otherwise provided for and is closed out each month to the various accounts benefited according to the cost of supplies used.

Surface Waste.—This account is intended to cover all cost of filling stopes from surface waste. The whole account is closed into stoping.

General Office.—This account is intended to cover all cost and expense covering the Office and Superintendence.

All these accounts are further itemized; for instance, the Stoping account is subdivided as follows: Labor, Supplies, 3-B Rand parts, 2 1/4 in. Rand parts, 2 1/4 in. Sullivan parts, 0-D Rand parts, total of all the above supplies. All these are apportioned from the storehouse account. Powder 1 1/4 in. 30 per cent., 1 1/4 in. 40 per cent., and 1 in. 30 per cent., fuse, caps, all are apportioned from the powder account. Next comes lumber and timber, portion used in stopes. Then comes the shops and compressor items, under which are charged the proportion from these accounts. Timbering and Surface Waste items cover the cost of putting in timbers and filling the stopes with surface waste, respectively, and are charged directly to stoping and are not distributed accounts.

The total tons mined and the total cost of stoping are figured, and then from these the cost per ton calculated.

Tonnage and Labor Chart.—The most important graphic record is the tonnage and labor chart which is posted in the main office where every one can see it and where it is studied by the shift bosses, the foremen and the other mine officials. On this labor chart in plotting the tonnage a scale of 100 tons to an inch vertically is used, while the days are plotted at intervals of an inch. This plotting is done on 10 scale paper. This scale is good for the Highland Boy Mine, where the tonnage for a day does not fluctuate more than 200 tons. A curve is plotted for the day shift tonnage and also one for the night shift, then the total tonnage for

the two shifts is plotted and also the total tonnage sent over the tramway. This tramway tonnage, as has been said before, is the most accurate of all tonnages. The tonnage mined is plotted from the estimated weight of a car of ore and the number of cars sent out by that shift. At first there were large variations between the mine tonnage and the tramway tonnage. Now the mine tonnage and the tramway tonnage are quite close together, rarely differing more than 50 tons in a daily output of 800 tons. The fact that this report made the men load the cars full has more than paid for the trouble in keeping the reports. Pay day and delays are shown by the corresponding sags in the tonnage lines.

Below the tonnage lines and on the same chart are plotted the number of machines working each day. In doing this a vertical scale of five machines to the inch is used. Curves to represent the total number of machines in use, the machines in ore and the machines on waste are plotted. Below this are plotted the labor figures. The scale used is ten men to the inch. Curves are plotted for the total men employed and the total men employed underground. At the bottom is plotted the tons per man curve. These are on a scale of 1/2 ton to an inch vertically. One curve shows the tons mined per man underground and another the tons mined per man employed about the mine both above and below ground. A scale of one ton to an inch was tried, but this was found to be too small a scale to show variation sufficiently striking.

On this tonnage and labor chart the most important figures in mining are clearly shown so that every one can readily see how efficient the work at the mine is.

Probably there is no better way to get cheap costs than to keep such a labor chart. It shows the efficiency in a department which includes 60 per cent. of the total cost of mining. There is only one other curve which might well be added at square set and stull timbered mines. This is a curve showing the number of men on the timber gang. Probably there is no work about a mine where more loafing is done than on the timber gang.

Such a curve in square set mining would also show whether the filling was being kept up with the stoping, for when it lagged behind, the timberman curve would mount as bulkheads became necessary.

Other Graphic Records.—In a number 376 Keuffel and Esser cross-section book, graphic records of most of the principal items in the accounts are kept. These include Cost per ton, Amount of the straight accounts, Distributed accounts, Actual total tonnage for each month, Actual average tonnage for each day for each month, Actual average tons mined per day per man employed, The same per man underground, Average number of laborers of each class per day for the month, The average of the total men employed per day for the month, the same figure for

Miscellaneous labor and also for Underground labor. Other curves are plotted for the average number of machines in ore, in waste, and the average number of all machines drilling.

In order to check the mine assaying and sampling, curves are plotted for the assays and analysis of the smelter pulp, ore bin samples (grab samples from tram buckets), and the average of all face samples. These generally check quite closely. The sum total of the net debits is plotted and also curves showing the cost per hole drilled by machines, cost per shift, cost per machine, holes drilled per shift, and other data from the monthly machine drill reports.

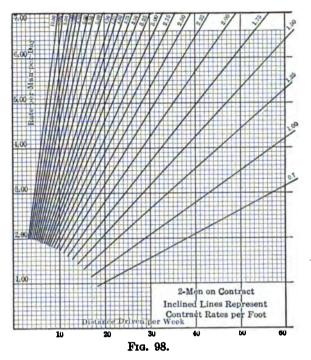
From these curves by comparing them with other months the officials can tell at a glance how the work in different departments compares with the work for other months. The manager can see at a glance exactly what part of the work needs watching and in case of any extraordinary figures can tell exactly where to look for the disconcerting data without wading through a whole mass of figures and reports. The graphic method of recording the different data increases the value of the cost and data keeping work fully twofold and probably no money spent by the company brings in, of course indirectly, greater returns than that spent in plotting the different data.

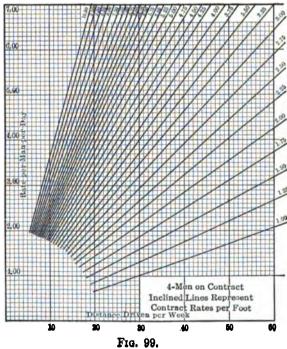
Blasting Report.—At the mine special provision is made underground to safeguard the men, especially from blasting accidents which, after falls of ground, are the most numerous accidents in metal mines. This Blasting Report (Fig. 112) shows the number of missed holes and their position while a blue print report, on which is marked the places that are dangerous, owing to approaching work, is also used. The headings of this report are given in an accompanying form.

Posted throughout the mine at these places are white painted sign boards on which in black letters is the warning "Dangerous from approaching working." While many of the workmen are foreigners who cannot read English, they soon find out the meaning of these white signs. Possibly a death head and cross bones might give a more vivid warning to any one whether he could read the sign or not.

All development and exploratory work at the Highland Boy is contracted that can be. Often by placing the price just high enough so that the machine helpers will have to aid in running the cars in order that the men can make good wages, the cost of the work can be made considerably less than by days pay, for the machine helper on days pay will only tend chuck and an extra mucker would have to be paid.

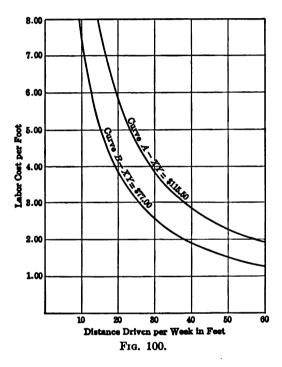
Contract Curves.—In order to facilitate the setting of contract prices and to aid in judging whether contract work will pay compared with days pay these curves have been worked out. These curves are plotted in No. 376 K, and E, cross-section books in which the paper is ruled to





tenths. The first set that applies to contract work are applicable to any camp, but those that apply to the days pay work of course are only applicable to camps where the Bingham scale of wages are paid. Consequently only two of the curves are shown, Figs. 98 and 99.

On the contract labor chart the scale is \$1.00 to an inch vertically, and 10 ft. to an inch horizontally. The horizontal distance represents the number of feet driven in a week, while the vertical scale represents the amount of money each man on the contract is earning a day. In



plotting these curves we have the equation that ny = mx, where y is the wage earned by each man a day, x is number of feet driven in a week, m is a constant, the price paid per foot, and n is the number of man shifts worked during a week. This equation is of the first degree and is therefore represented by a straight line.

Consequently in plotting the different lines on these diagrams the greatest distance that is represented is assumed to be the distance driven. This distance and the price paid per foot are multiplied together and then divided by seven times the number of men working on the contract. This gives the wage that each man would earn each day had that distance been driven. Upon plotting this rate as an ordinate, or vertical distance, and an assumed distance driven a week as abscissa, or

horizontal distance, and connecting the point thus obtained with the origin by a straight line, you have a curve which represents all the conditions when that rate per foot is paid.

This curve is useful in many ways. It can be used to tell at a glance what the men are earning from the rate of progress that they are making. Or in setting the contract it can be used to fix the price per foot when one decided how much the men should drive or raise in a week in that rock and what wage the men should be allowed to make a day.

The Pay Day Curves.—The pay day curves are plotted with the cost of labor per foot as verticals or ordinates and the distance driven per week as horizontals or abscissæ. The formula for these curves is XY = M, where M is the constant, representing the wages earned in a week by the crew in question, Y is the cost of labor per foot and X is the distance in feet driven per week. This equation is that of a parabola, Fig. 100.

The curve is most easily plotted by means of the slide rule and dividing the constant sum by either the assumed distance driven per week, or the assumed cost of labor per foot. The first is the better way as the quotient is the price per foot, and as a tenth-scale paper is used the decimals can easily be plotted. As to the two curves shown, the first XY equals \$115.50, represents the conditions when two machine men, two helpers and two muckers are working in a drift on the two shifts. It is figured as follows:

2	Machine men	@\$3.00, 7 shifts each,	\$42.00
2	Helpers	@\$2.75, 7 shifts each,	38.50
2	Muckers	@\$2.50, 7 shifts each,	35.00

Total, \$115.00

Presuming 60 ft. to be driven a week, then the price per foot is \$1.92. The second curve, XY, equals \$77.00, represents a crew of two machine men and two muckers.

The pay day curves are useful in telling at a glance the approximate cost of the labor per foot at the rate the drift is being driven a week and whether it is better to contract the drift. You can also tell how far a contractor would have to drive at any price per foot to make a days pay. All these curves apply to any kind of lineal advance, whether it is raising, drifting or shaft sinking. The curves are great aids and have been found very useful.

Blasting Report (Form 1, Fig. 101).—At the Highland Boy mine there are two bosses on shift. These make out their reports together. One of these reports is called the Blasting Report. An accompanying form shows the different headings on this report sheet. This report is made out mainly to give information to the other shift as to the missed holes and what is required at each working place.

Level Working Place		Blastin	g Done	Blasting Done on Shift	73	-					BLASILING REFORT	s: If blasting is no	g is not	Remarks: If blasting is not done at time specified
		Machine Drills		Hand	Hand Work		No. Missed		Ready	Is the pipeman		rintendent ine at any rintendent or if timbo	other tin , state wi ers have	by superintendent state reason why. It binst- ing is done at any other time than that specified by superintendent, state why. If there has been a cave or if timbers have been showing much
_	Number Blasting	per Time of Blasting		Men Blasting	Time of Blasting			THORE	TIBOR	ререец		report the ser workin imn not œ	same in ig place. overed by	weight report the same in the column opposite the proper working place. Report anything in this column not covered by the others.
	, A	UTAH CONSOLIDATED MINING COMPANY.	OLIDA'	TED MI	NING C	OMPAN	İ	HIFT F	OREMA	SHIFT FOREMAN REPORT		Date		Date Shift
Working Place	e Machiners		Machine helpers	Miners	Muckers	ars Tr	ammers	Trammers Timbermen Timbermen	men Tin	imbermen helpers			Number	rs —
	-	UTAH CONSOLIDATED MINING COMPANY.	SOLID	ATED M	INING	COMPA	INY.	POWD	POWDER REPORT	ORT	Date	- 1	Sh	Shift
ni of line		Powder			÷	Class of Work	Work				Number of Fuses Issued	nses Issue	lo bea	Remarks: Enter in this column. size and
Powder mber of mine D		is to be used	Ŕ	Big	Small	=	Hand	pq	Blacting		Length of Fuses in feet	uses in feet	der us	amount of all powder and fuse returned to magazine, and any
No. Occu-	Level	Working Place	Sticks	Holes	Sticks	Holes	Sticks	Holes	Sticks	Holes	3, 2,	7, 8,	mod Mod	other information not covered by pre- vious columns.

Shift Foreman Report (Form 2, Fig. 102). -The shift bosses together also make out the Shift Foreman's report, the headings of which are given in an accompanying form. This report is merely a labor report and is used to check the timekeeper who goes through the mine during the first part of each shift in order to check up the places where the men are working so that he can distribute the labor expense properly to the different items in the monthly report. The labor sheet is also used in making up the labor and tonnage chart which is described in the fore part of this article. These are the two principal reports, but special requirements have necessitated others.

Powder Report (Form 3, Fig. 103).—The company decided to keep track of the powder and fuse issued to each man. So powder magazines were constructed in different parts of the mine. These are supplied with dynamite and capped fuse by the powder monkey, and they are kept locked. The key is given to some one working in that part of the mine, generally a timberman and less often a miner. This man comes to the magazine an hour before blasting time and unlocks the magazine he is appointed to care Then he gives out dynamite and fuse and records the number of the man, the place that the man is working, the sticks of dynamite and the grade, the number of holes drilled, the number of the machine and other data on the form that is called for. Powder report is used in several different ways. It is used for supplying data entered in the "Daily Powder Report" (form 4, Fig. 104), also for entering in the record of the individual machine drills, and for distributing the amount of powder used in Development work, in Exploring and in breaking Surface Waste, the balance is charged to Stoping.

In the above all drifting, cross-cutting

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and raising in ore, or for the purpose of developing a known ore body is charged to the development work, while any such work done in searching for unknown ore bodies is charged to Exploration.

Tool Sharpening Report (Form 5. Fig. 105).—This report was started owing to the large number of drills and tools that were disappearing. This report is made out by the Blacksmith foreman, the blacksmith counts the sharp steel that is sent to each opening each day and reports the tools and drills that are returned from each opening.

These figures are entered in a K. and E. cross-section book No. 376 having columns with similar headings to the blacksmith's report printed by hand in them except that in place of the mine working column there is a date column. These pages are ruled to a tenth scale and are about 6 1/2" ×8 1/2" in size. The cross-sectioning aids greatly in keeping the figures in the columns vertical. In one part of the book a summary of all the workings is kept, while in another part there is an individual record of each working place where tools are received or sent out, the same headings being used as in the summary. These reports are balanced every change day and at the end of each month and the on-hand of all dull and sharp steel in the shop at the first of the month is taken. In this way an approximation is reached regarding the number of tools and drills lost, and also an idea of where the loss is occurring. From this report the superintendent readily learns whether the different machines are being supplied with sufficient sharp steel as well as other information.

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Mine V	Large St	Small St	Hand St	Picks	Day	Night	Total	Day	Night	Total	Day	Night	Total	Day	Night	Total	Large Steel	Small Steel	Hand Steel	Picks	Remarks: Make a note of irregulariti
				:															ı		

Fig. 105.—Form 5.

The men on the Electric locomotive report the number of cars delivered to the tramway bins in the book, the tramway men keep count

of the number of tram buckets sent out in another and sample each bucket as it is loaded, while the number of railroad cars and weight of ore shipped to the smelter are also reported in another book. From the different books the figures for these items are obtained for the different reports.

The foreman of the sawmill makes a report in regard to the time spent in framing timbers for the different openings. The machine shop foreman records in a journal the number of each machine received for repairs and the time that he received it. He keeps account of the cost of repairing the drill and finally reports when it was sent back to the mine. The machine drills, to facilitate this recording are marked with a brass tag screwed to them having a running number. By the number, the make and size of the drill is known as certain ranges of numbers are kept for each size and make of machine used in the mine.

Machine Drill Reports (Form 6, Fig. 106).— From this report of the machine shop foreman the monthly machine drill record is made out. using the powder reports to determine in what places the drill was working and who was running the drill. From the powder report the number of holes drilled is also obtained while the machine shop record shows when the drill was sent out and when taken in. Of course the cost is distributed according to the class of work that the drill was working on and the proper part of the cost of the repairs is apportioned to each account from the percentage of the time that the drill was used on that kind of work. This Monthly Machine Report is kept on a form as shown. By indexing the numbers of the men working on the different machines a record is kept of the work done by each drill runner.

Sampling Records.—At the Highland Boy mine the ore varies in value greatly within short distances, and from its appearance nothing can be told about what the ore will assay.

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On that account the ore has to be sampled closely, in fact every set of ore mined is sampled. To do this a sampler is employed on each shift. These samples are given a running number and a tag is nailed to the cap nearest the sample. This tag is punched out of linen mapping cloth and is marked with water-proof ink. This has been found to be the best way to mark the position of the samples, although several other methods were used. Besides the running number placed on the sample bag a paper tag containing the position of the set sampled with respect to the zero set, which is carried up from floor to floor, through the stope, is also put in.

The samplers record on a Floor Map the position of the different samples. On the Assay Map the final record is made.

The assay results are also written in the shift bosses' and the foreman's pocket note books, together with the running number of the sample. They use the tag to find the position of the sample. The assay results are also recorded on large Floor Maps, and the date of the sampling is also written in each set. These Floor Maps are kept on loose leaf pages 36 in.×23 in. The title consists of "Utah Consolidated Mine Assay Map" with headings to designate the Level, Floor, Room, and the orebody. On the inside end is a 4-in. margin carrying the perforations for binding, while at the outer edge is a 2 in. margin. This leaves a space 29 3/4×19 3/4 available for the Floor Map. This is divided into squares 2 1/2 in. on the side and each of these squares is subdivided into 25 squares so that each set is represented by an area 1/2 in. square. The assays from the drifts, cross-cuts, and raises, which are sampled after each round is blasted are recorded on Assay cards, Fig. 107, form 7.

	LE	VEL No		FLOORS O	VER	L	OCAT	ION		
Date	Previously Reported	Advanced	Total	Advanced	Copper %	Gold \$	Silver Ozs.	Block	Section	
			! ! 							

Fig. 107.—Form 7.

Only the average of the assays for the week are recorded on these cards, but the individual assays can be obtained from the assayer's book. On the Assay plan map only the percentage of copper is recorded as

the gold and silver contents bears a fairly constant relation to the copper in the ore. After passing through a lean place in the stope, often rich ore is again struck. In fact many new ore bodies have been found by drifting into old stopes and exploring areas marked mineralized upon the old Geological Maps and the Assay Plans. This map shows the value of the geological mapping and of the keeping of Assay Plan Maps of each floor. In case that caving were attempted all the advantages of this work would be lost, which at this mine, owing to the fact that all the limestone carries some silica, the silica contents of the ore would be so increased that much, if not all, the gain in cheapened stoping costs would be eaten up by the higher smelting charge.

As has been intimated, Geological Maps are also kept showing the geological conditions in the stopes, drifts, and raises, the dip and strike of the faults, the position of the different contacts between quartzite and limestone and of the different monzonite dikes are indicated, especially such areas as show signs of mineralization.

The Drilling Report (Form 8, Fig. 108).—Often it is desirable to know what is the assay of the ore being mined so as to regulate the grade of ore shipped in order to take the best advantage of the smelting contract. To do this the form of report called Drilling Report is used.

		Big Machines			Small Machines			Single Jackers						
Level	Working Place	Place Drilling	Est. Tons	% Cu.	Tons Cu.	Place Drilling	Est. tons	% Cu.	Tons Cu.	Place Working	Est. Tons	% Ca.	Tons Cu.	Remarks

Fig 108.—Form 8.

The place where the drill is working is determined from the sampler's report, while the assay of the ore in which the drill is working is determined from the assayer's book, or else from the Assay Plan Map. The amount of ore broken is determined by estimation. For large machines in stopes 40 tons per day are used, for small machines 30 tons per day, and for hand drilling the amount of ore trammed from each opening. By these approximations the grade of ore being mined is determined and adjusted.

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Experience has shown that this method is accurate and gives a mixture assaying within a few tenths of a per cent. of the grade calculated. These are all the primary reports, from them other reports are made up.

Daily Labor Report.—The Daily Labor Report is made out by the timekeeper. This report is used in plotting the Labor Chart already mentioned.

The first column is for the date, then comes labor grouped under the general headings, Day shift, Afternoon shift, Night shift and Total labor. The sub-headings under the first three are: Shift boss, Mine foreman, Timberman, \$2.75 miners, Muckers, \$3.00 miners, Machiners, machine helpers, timbermen helpers, Total number of men, Tons of ore mined, Tons of ore mined per man per shift.

The Monthly report to which these daily reports are posted is Fig. 109.

Daily Machine Report (Form 10, Fig. 110).

—From the different mine reports a number of daily reports are made out. The Daily Machine Report is kept on blueprint paper printed from cross-section tracing cloth so as to give guide lines for the different figures as this facilitates the averaging which is done once a week and at the end of each month. The writing on the blueprint is done with caustic soda which gives a white line. This form is shown below.

Daily General Mine Report and Daily Labor and Machine Report.—The other daily reports are kept in K. and E. No. 376 cross-section books. Each of the two general mine reports takes two of the opposite pages, while in the back of the book is a summary of the different items for each month of the year. The headings of these two tables are given in the accompanying forms. These daily reports are totaled and averaged each week and at the end of each month.

Machine No.	Date	Level	Working Place	Account	Drill Run'rs No's	Holes Drilled	Total Holes per Day	Average Holes pe Shift
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Fig. 110.—Form 10.

In the General Mine Report (form 11, Fig. 111), the number of cars shipped is obtained from the car book. The tons shipped are calculated from them by using the average weight of a car load of ore as determined during several months. The total number of men underground and also the total employed are obtained from the Labor Sheet. In calculating the tonnage per man the estimated tramway tonnages are used as these are the most accurate figures obtainable at the mine since the average weight of a bucket of ore as determined during several months is used. The underground labor is estimated from the Labor Sheet. The ore sent over the tramway is estimated in the manner already indicated, while the analysis of the ore is that of the grab sample taken from the differents buckets at the tramway loading station. The last column is calculated from the total tons shipped since the first of the month; this column is important as indicating whether or not sufficient ore is being mined.

In the second report called Daily Labor and Machine Report the miscellaneous labor items are obtained from the labor sheet, the data on the machine drills is obtained from the sampler's reports, the weekly advance from the weekly reports of exploration and development, the mine assays from the preceding daily report, and the smelting assays from the smelting reports.

Monthly Summaries.—In the back of the daily report book, the summary for each year takes up two pages. The months are the headings for the vertical columns, while the side headings are as follows: Number of R. R. cars shipped, Number of Buckets sent over the Tramway, Estimated tonnage from R. R. cars, The same from Tramway Buckets, Actual number of tons shipped, per cent. copper in ore from

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The Daily Powder Reports are kept in a K. and E. No. 376 book, the forms for the 30 per cent. and 40 per cent. dynamite occupy two pages each. The form for each grade is the same. All the data for these powder reports is obtained by compiling the powder reports from the different magazines.

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Fig. 112.—Form 12.

SMELTING COPPER ORE

ACCOUNTING METHODS OF THE CALUMET AND ARIZONA MINING COMPANY

The Smelting works of the Calumet and Arizona Mining Company are located at Douglass, Arizona. The plant is equipped with six furnaces, having a capacity of 2500 tons per day and the necessary Converters to handle the furnace output. Ore from the mines averages about 84 lb. of Copper per wet ton, equal to 4.2 per cent. and also contains precious metal values.

The ore comes to the smelter in cars and is dumped in bins, the oxides and sulphides being kept separate.

The smelting is accomplished in blast furnaces, the fuel being mixed with the charge. It consists essentially of subjecting the ores mixed with suitable fluxes to make a charge, to the action of intense heat, whereby the charge is rendered fluid, the gangue combining with the flux to form a slag, while the metals combine to form a matte.

The separation of the slag and matte takes place while in a molten condition, by reason of the difference in specific gravity.

In copper smelting the valuable product from the furnace is copper "matte" when sulphide ores are treated, and "black copper" when oxide or carbonate ores are treated.

For smelting, the mixture of ores and fluxes must be of such a composition that the resulting slag will be sufficiently liquid to allow the matte to separate from the mass readily and flow freely from the furnace.

This matte is transferred from the furnaces to Converters with the aid of electric cranes, and "blown" to "Blister Copper" in the Converters. As the resulting slag from this operation contains metallic contents, it is placed back in the furnace for further treatment.

The final product of the smelter is blister copper which contains precious metal values; it is necessary to receive further treatment at a refinery to remove the precious metals before the copper is ready for commercial use.

OPERATING ACCOUNTS-SMELTER BOOKS

Expense accounts	Closed accounts	Shop accounts
General Expense Office Expense Furnace Expense Converter Expense Supplies Coke Cash	Laboratory Expense Boiler House Expense Power House Expense Delivering Ore and Coke Loading Bullion Briquetting Press Pumping Mud Mill Crane Expense Hauling Slag Repair of Buildings Repair of Dwellings Lighting Expense Warehouse Expense Electric Plant Engineering Ore Sampling Unloading Ore	Machine Shop Blacksmith Shop Carpenter Shop Electrical Shop

EXPENSE ACCOUNTS

General Expense.—Charge to this account:

Watchman as per time book Stableman as per time book Change room boy time book Labor and supplies to operate the Change room and Stables Heating Insurance Line Rider as per time book Telegrams Telephones Taxes

Ice Laboratory Expense Pumping Expense Repair of Buildings Repair of Dwellings Lighting Expense Warehouse Expense Engineering Expense Sampling Ore Personal Injuries.

This account will receive credit for Dwelling and Land Rents, also unclaimed wages.

Office Expense.—Charge this account with:

Clerk as per time book Asst. Clerk as per time book Stenographer as per time book Night Time Keeper as per time book

Superintendent as per time book Yard Clerk as per time book Janitor as per time book Postage and Box rent Printing and Stationery Office Furniture and Fixtures Labor and supplies to operate and maintain the Office.

This account will receive credit for all commissions on collections.

Furnace Expense.—Charge this account with:

General Foreman, proportion Foreman as per time book Feeders as per time book

Tappers as per time book
Tappers helpers as per time book
Slag men as per time book

Masons as per time book Laborers as per time book Coke

Power house, proportion
Delivering Ore and Coke expense
Briquetting Press expense

Hauling Slag expense

Unloading Ore

All labor and supplies to operate and maintain the Furnaces.

Credit this account with all sales of Old Brass castings.

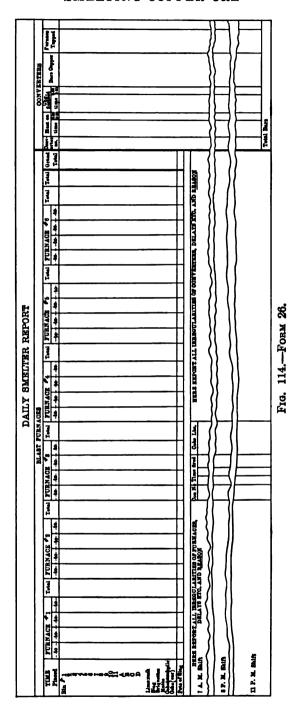
Converter Expense.—Charge this account with:

General Foreman, proportion Foreman as per time book Skimmers as per time book Punchers as per time book Moulders as per time book Masons as per time book Coke Power House, proportion
Mud Mill expense
Crane expense
Loading Bullion expense
Loss on Silicious Ore (lining)
All labor and supplies to operate
and maintain the Converters.

Credit this account with all sales of scrap iron, profit on Silica sold and profit on Silicious ore used as lining.

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Fig. 113.—Form 83.



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Fig. 115.—FORM 24.

Daily Furnace Report.—A daily report to cover the operations of each furnace is made out in duplicate (form 33, Fig. 113). A separate report will be made out for each furnace to cover 24 hours operations. Original copy goes to the Supt. and duplicate to the Clerk.

This report is intended to show the kind of material of each charge, whether day or night shift, and the weight in pounds. The weight of the charge will also be shown in the day or night shift columns, and the bin numbers from which the charge came noted. Each charge is entered separately.

The number of Pigs tapped will be shown in the proper place, the number of Pots of Slag noted, the Fuel consumed, kind and amount, number of hours the pump runs, and the Blast furnace pressure at stated intervals.

Daily Smelter Report (Form 26, Fig. 114).—A daily report to cover the operations of all furnaces and converters is made out each day from the Daily Furnace Report. The day's operations are divided into four periods of six hours each and in this report the material going into the furnace is shown under the furnace number affected, and for the proper time period. The charges are subdivided to show from what bin number the ore came (separate bins are for the different grades of ore and the different shafts) also quantities of Lime rock, Slag, Briquettes, Matte and Coke.

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Fig. 116.—Form 30.

This report gives for each furnace the quantity of material treated for each period and for 24 hours. For the Converter operations are shown the number of converter, time the blast is on and time the charge is finished, bars of copper produced and the furnace number that should be credited with the output.

Another statement showing for each converter, the time fired and the pounds of coke used is also kept.

This report as a whole gives the quantity of material treated of each kind for each furnace and as a total for all furnaces, also the output in copper for each furnace and as a total.

Monthly Furnace Report (Form 24, Fig. 115).—This report is kept for each furnace and is cumulative for the month. Information for this re-

port is taken from the Daily Smelter Reports. The report is kept in book form.

Gas Analysis Report.—This report (form 30, Fig. 116) is intended to cover the analysis of smelter gases. The results of these analysis are recorded showing date, place and description with a result of the analysis, showing the per cent. of the ingredients of the gas sample by volume.

CLOSED ACCOUNTS

Laboratory Expense.—Charge this account with:

Chemist as per time book
Asst. Chemist as per time book
Labor as per time book
All labor and supplies to operate and maintain the Laboratory.

This account is closed out to General Expense each month.

Boiler House Expense.—Charge this account with:

Foreman as per time book
Fireman as per time book
Masons as per time book
Laborers as per time book
Fuel Oil
All Labor and supplies to operate and maintain the Boiler plant.

This account is closed out each month to the various accounts benefited on a basis of horse power used.

Boiler-room Record.—A daily report covering the operation of the steam generating plant is made out to cover the 24 hour period (form 64, Fig. 117).

This report shows the feed water pumped to the boilers, the oil and packing used, temperature of water and gases at various points, fuel oil received and used, and information pertaining to the economical working of the plant. This report is made out by the foremen in charge on the different shifts.

Water-treatment Record.—Owing to the fact that all water for steam purposes is too hard and severe on the boilers for economic use, it is first treated to soften and purify it. The details of this treatment are recorded on a Water-treatment Report (Form 31, Fig. 118) showing date, place and quantity treated, hardness, both initial and final, chemicals used, itemized and sub-divided to show quantity and cost, total cost, etc.

This report is made out by the chemist in charge.

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Fig. 117.—Form 64.

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Fig. 118.—Form 31.

Fuel Oil Tests.—Crude oil is used as fuel and as it is purchased on a basis of degrees Beaume and B. T. U.'s each car received is tested. All data covering oil received and tests is recorded on Fuel Oil Test Reports. (Form 32, Fig. 119.) These reports show the Date received, place, gallons, etc. Reports are made out by the chemist in charge.

Date Received	Shaft	Quantity in Gallons	Car Num- ber and Initials	Degrees Beaume	British Thermal Units	Dirt and Water % Vol.	Remark

Fig. 119.—Form 32.

Power-house Expense.—Charge this account with:

Engineers as per time book
Oilers as per time book
Pumpmen as per time book
Boiler House Expense, proportion
All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of horse-power used.

Delivering Ore and Coke Expense.—Charge this account with:

Foreman as per time book
Elevator man as per time book
Charge Wheelers as per time book
Boiler House, proportion
All labor and supplies used to operate and maintain the service.

This account is closed out each month to Furnace Expense.

Loading Bullion Expense.—Charge this account with:

Labor and supplies
Boiler House proportion
All expense to operate and maintain the service.

This account is closed out to Converter expense each month.

Briquetting Press Expense.—Charge this account with:

Foreman as per time book
Feeders as per time book
Electric Plant, proportion
All labor and supplies to operate and maintain the service.

This account is closed out each month to Furnace Expense.

Pumping Expense.—Charge this account with:

Pumpmen as per time book
Boiler House, proportion
All labor and supplies to operate and maintain the service.

This account is closed out each month to General Expense.

Mud Mill Expense.—Charge this account with:

Foreman as per time book
Runners as per time book
Liners and helpers as per time book
Electric Plant, proportion
All labor and supplies to operate and maintain the service.

This account is closed out each month to Converter Expense.

Crane Expense.—Charge this account with:

Crane men as per time book
Chasers as per time book
Electric Plant, proportion
All labor and supplies to operate and maintain the service.

This account is closed out to Converter Expense each month. Hauling Slag Expense.—Charge this account with:

Runners and Helpers as per time book
Electric Plant, proportion
All labor and supplies to operate and maintain the service.

This account is closed out each month to Furnace Expense. Repairs of Buildings.—Charge this account with:

Carpenters as per time book
Painters as per time book
Masons as per time book
All labor and supplies to maintain plant buildings.

This account is closed into General Expense each month. Repairs to Dwellings.—Charge this account with:

Carpenters as per time book
Painters as per time book
Masons as per time book
All labor and supplies to maintain company Dwellings.

This account is closed into General Expense each month. Lighting Expense.—Charge this account with:

Electric plant, proportion
All labor and supplies to operate and maintain the service.

This account is closed into General Expense each month. Warehouse Expense.—Charge this account with:

Supply Clerk and assistant as per time book All labor and supplies to operate and maintain the department.

This account is closed into General Expense each month. Electric Plant Expense.—Charge this account with:

Engineers as per time book Boiler House, proportion All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of current used.

Electric Power Record.—A Daily Report (form 65, Fig. 120) covering the output of the Electric Plant is made out by the engineers in charge each shift, showing the current furnished each circuit each shift.

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Relining Plant Briquetting Plant Incandescent Lights				
	· DIRECT (URRENT		
	Present	Last	Difference	Remarks
Crane circuit B. S. Shop Mach. Shop Cranes Slag Circuit Sampling Mill Electric Shop Slag Line Arc Lamps				

Fig. 120.—Form 65.

Engineering Expense.—Charge this account with:

Engineers as per time book All labor and supplies to operate and maintain the service.

This account is closed into General Expense each month.

Ore Sampling Expense.—Charge this account with:

Foreman as per time book Samplers as per time book Switching to and from sampler All labor and supplies to operate and maintain the service.

This account is closed into General Expense each month.

Unloading Ore.—Charge this account with:

All labor and supplies to operate and maintain the service.

This account is closed into Furnace Expense each month.

SHOP ACCOUNTS

Machine Shop Expense.—Charge this account with:

Superintendent of Machinery as per time book Master Mechanic as per time book Machinists and helpers as per time book Electric Plant, proportion

All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Blacksmith Shop Expense.—Charge this account with:

Foreman as per time book Blacksmiths as per time book

All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Carpenter Shop Expense.—Charge this account with:

Foreman as per time book

Carpenters as per time book All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Electrical Shop Expense.—Charge this account with:

Foreman as per time book

Llectricians as per time book

All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

ACCOUNTING, GENERAL STATEMENT

The detailed accounts carried on the Smelter books are subsidiary to the Smelter accounts carried on the Mine books as follows:

> Cash Operation Construction. Supplies

Coke

All supplies and material for the smelter are purchased through the Purchasing agent at the mine and all invoices of whatever nature against the smelter pass through the mine books, being charged through the Voucher Record to the Smelter Accounts effected. (The Voucher Record used is similar to that used by the Ojibway Co.)

Invoices.—All invoices are received by the company in triplicate and forwarded to the smelter clerk. They are checked as to material received etc., and entered in the stock records (form 40, Fig. 121).

		Stock Receive		On Hand				
Date	Bill No.	From whom	Quantity	Cost Ea	Date	To whom	Quantity	Quantity
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Fig. 121.—Form 40.

A separate card is kept for each kind or size of supplies purchased.

All invoices are O. K.'d by the supply clerk for receipt of material and approved by the smelter superintendent for payment. The original and duplicate copies are forwarded to the mine for payment, being paid by the mine clerk and charged to the smelter accounts previously mentioned. The triplicate copy is retained at the smelter office.

All invoices are recorded in detail in a book "Record of Invoices Received" (Fig. 122).

INVOICE BOOK								
Date	Quantity	Articles	Price	Amount	Freight	Total Cost		
					<u> </u>			
			¦		i			
				<u> </u>	!			

Fig. 122.

Supplies.—As stated above supplies received are entered on stock record cards, which show the invoice cost to which is also added the freight.

Supplies are only given out at the warehouse on presentation of an order signed by the head of the department requiring the same, form 41, Fig. 123.

1	ease give bearer the following	
No.	Articles	Charge

Fig. 123.—Form 41.

These orders must state the quantity and kind of material required and the account to which the charge should be made. From these orders the material used is charged off on the stock record cards and the values entered on the orders. The supplies used can now be posted to the Supplies Used Sheets (not shown, similar to the Ojibway Mining Co.) from the Supply Orders. The supplies are entered against the proper account or sub-division as the case may call for. At the end of the month the sheets are totaled and summarized.

Freight Expense Bills.—All freight expense bills are entered in a book for that purpose as follows (Figs. 124-5):

	REC	ORD OF EX	PENSE BI	LLS	1 1	
Consignee	Articles	Weight	Rate	Local	Advance	Tota

Fig. 124.

Engaging Labor.—Applications for situations with the company are made out on blanks provided for the purpose (form 42, Fig. 126) and besides the other information called for, must name two previous employers as reference.

		CA	LUME	r & A.R.	IZONA 8	SMELTER	
Expen	se Bill	C	Car		Bill	From	Consignor
Date	No.	No.	Ins.	No.	Ins.	From	Consignor

Fig. 125.

Upon the filing of an application properly signed with the company, the matter is then taken up with the parties given as reference:

In taking the matter up with the parties given as reference a regular form (No. 43, Fig. 127) is used for the purpose, the replies to the information called for on this form are made on the lower part of the sheet

For position as		APPLICATION FOR SITUATION
2. Age	Fo	r position as
3. Nationality	1.	Name in full
4. Married or single 5. If married is family here 6. Where was your last employment and when 7. By whom employed 8. To whom do you refer as to your personal character and qualifications for position as A	2.	Age
5. If married is family here	3.	Nationality
6. Where was your last employment and when 7. By whom employed 8. To whom do you refer as to your personal character and qualifications fo position as A B In order that the may employer and request and authorize each of the companies for whom I have worked to give the above named company all the information they may be in possession of whether shown by my personal record or otherwise, as to my personal character and also my qualifications for the position I have herein applied for and the reason why I was discharged or quit their service, upon any inquiry that may be	4.	Married or single
7. By whom employed	5.	If married is family here
8. To whom do you refer as to your personal character and qualifications for position as A	6.	Where was your last employment and when
A	7.	By whom employed
A		· · · · · · · · · · · · · · · · · · ·
B	1	
In order that the		•
personal character and my qualifications for the positions for which I have made application I refer to each of my former employers and request and authorize each of the companies for whom I have worked to give the above named company all the information they may be in possession of whether shown by my personal record or otherwise, as to my personal character and also my qualifications for the position I have herein applied for and the reason why I was discharged or quit their service, upon any inquiry that may be		
	per pa the per an	rsonal character and my qualifications for the positions for which I have made applition I refer to each of my former employers and request and authorize each of the comnies for whom I have worked to give the above named company all the information by may be in possession of whether shown by my personal record or otherwise, as to my cronal character and also my qualifications for the position I have herein applied for the reason why I was discharged or quit their service, upon any inquiry that may be

Fig. 126.—Form 42.

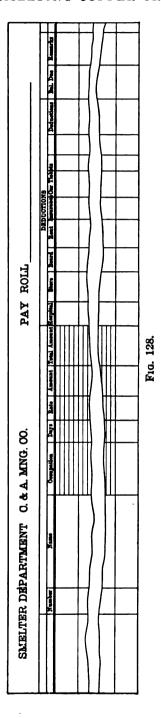
so that both questions and answers are on one sheet and come back to the company and are filed away as reference.

All employees of the company are given numbers when they are assigned work, these numbers run from one up and do not have a continuous expansion, that is an employee having as his number ten and leaving the employ of the company would leave that number vacant so that the next man to enter the employ of the company would be assigned the number ten. The lowest vacant numbers are always given out first so that the range of numbers in use will be as low as possible, this facilitates matters greatly when making up the Pay-roll.

Calumet & Arizona Minis	ng Co.
	Bisbee, Aris
Dear Sir:	
Mr	has applied to this company for
work as a	
	and refers us to you as to his personal character and
• • • •	will greatly oblige and will be regarded as `confidential. An equested, as we are waiting for such reply before putting him
	Ву
	Бу
	•
Mr	•
Mr	Third Vice-President
	Third Vice-President
	Third Vice-President
His work was satisfactory unsatisfactory	Third Vice-President
His work was satisfactory	Third Vice-President

Fig. 127.—Form 43.

Time Books.—All time is kept by timekeepers both day and night; this is taken down in pocket time books, ruled for a month of 31 days; the time is transferred from these books to an office time book each day. The office time book is ruled the same as the pocket time book except that it is of a great deal larger size. In both time books the various classes of labor are segregated so that Surface laborers would be grouped together, Carpenters together, etc. At the end of the month the time is extended and the gross amount due each employee is figured and entered in the office time book. The amount due each class of labor is totaled



and a summary of the earnings for the month is entered in the book immediately following the time entries.

Distribution of Labor.—The timekeepers while taking the time also keep a distribution of labor; this distribution is kept in the time book and arranged so that the distribution for each class of labor will follow

. No								
Calumet	& A1	ount v	Mining	Co.				
For			19	********				
-	CRI	EDITS						
Ву								
		<u> </u>		+	1			
					<u>1</u> _			
		9-			1			
		ğ		+	┨			
		EBITS	- 1		NOT NEGOTIABLE			
For Doctor					Z			
" Store		- 1		 -	8			
" Board				- 	12			
" Insurance					ᄩ			
" Car Tickets				ļ	Į M			
" Subscription								
Total			1		_			
Received payment in	full							
Note:- This should be	signed	before :	presenting					

Fig. 129.

the time of that class of labor. This distribution is extended and totaled at the end of the month and checked with the time, after that it is ready for use in making up the Cost Sheet.

Pay-roll.—The time of the employees is posted direct from the office time book to the pay-roll (Fig. 128), and as it frequently happens that a man will have worked at several different jobs during the month that entitle him to different rates of wages, the pay-roll is so designed that the various classifications and earnings of an employee can be shown and

		Not Unicaded Lemetre		
	Our Beale Weight	Green		•
SMELTER	1 154		}	}
SCEIVED AT				130.
record of Shipments received at smelter				Fre. 130.
pet		The state of		
	Unload	No. laktais Date Hour Departed		
	<u> </u>	Intitals		
	8	S.		
	Placed	T)
	Beestre	å		1

extended separately. After the time has been posted from the time book to the pay-roll it is checked, and then the various deductions on account of Hospital, Board, store, etc., are posted in, these deductions are proved before the totals are extended and the amount due the various employees figured.

When the pay-roll is complete and balanced a summary is made for the month showing the Earnings as per Time Book and otherwise, and to offset that the Deductions in detail.

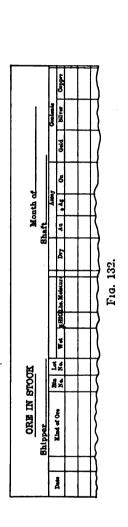
The pay Dockets (Fig. 129) are written as soon after the pay-roll is completed as is found convenient, they are then distributed to the employees and on pay day are presented at the pay window properly receipted and in exchange receive their check.

Ore Shipments Received.—All ore shipments received are entered in the "Record of Shipments Received" book, Fig. 130. This book is ruled to provide for all necessary data regarding shipments received.

Ore Moistures.—All ore shipments received are entered in the Ore Moisture record after being assayed (Fig. 131). A separate page is assigned to each shaft of each shipper, or each shipper as the case may require. The information called for is Date received, Wet weight, per cent, moisture, Dry weight, there is also entered in this book the quantity of ore treated each day for each shipper, showing the Wet weight, per cent. moisture, Dry Weight, per cent. copper and pounds refined copper.

				MOISTUR					
Shipper	1			1			_		_
Date	Or	e Receiv	ed	0	re Treat	ed		콩호	
Received	Wet Weight	%H ₂ O	Dry Weight	Wet Weight	%H ₂ O	Dry Weight	% Cu.	Pounds	
			-						j
	<u> </u>								
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Fig. 131.



		,_			
		L	<u> </u>		
<u> </u>			Oopper		
		Contents	Silver		
	REFINERY RESULTS		Au Ag Cu Gold Silver		
	RE		o		
	ERY	Assay	Ag		
	Month of REFIN		Ψn		
ه و ر		-		-	
Mont			19 M)	
		1	Daris Weight	. (
			Oopper		9
		r	<u> </u>	7	T. 199
		tents	Silver		5
		S	Gold		
		ľ	ő		
e l	53	Assay	87		
HALI	ESU	L	Ψ		
BULLION SHIPPED	SMELTER RESULTS	1	weignt		
BUL	MEL	-	Der		
	02	ų	Int.		
		ပ်	No.		-
		Pot	No.		
		Date	Shipped No. No. Int. Dars Weight Au Ag On Gold		

Ore in Stock.—In this book (Fig. 132) is entered all shipments received, a separate page being assigned each month to each shaft of each shipper or each shipper as the case may require. The entries in this book call for Date and kind of ore, the Bin to which it is unloaded, Lot number, if any, the Weight both Wet and Dry, per cent. and pounds of moisture, the assay and the value of the contents.

Refinery Results.—All the product of the smelter shipped to the refinery is entered in this book (Fig. 133), showing the Date shipped, Lot number Car, Bars, Weight, Assay and contents of the different metals in value. When the returns are received from the refinery, which show the Bars, weight assay and value of contents, it is entered as an offset to the shipment.

Production Statement.—At the end of each month there is made up a statement (Fig. 134) showing the production, shipments and on hand at the end of the month. The number of bars of copper, their weight and average assay, also the contents in Gold, Silver and Copper.

Cost Sheets.—The cost sheet which is made up in book form shown as Figs. 135 to 146 inclusive is made up as soon as practicable after the end of the month.

Donatation	Bars	Pounds	Aver	age A	548.J		Co	ntents
Description	DâlT	Blister	AU	AG	CU	AU	AG	Fine Copper
On Hand		-				- -		
Produced During the Month								
Total								
Shipped During the Month								
On Hand								
		-						

Fig. 134.

No. Men	Account	Cost Ton Dry Ore	Cost Pound Fine Copper	Per Cent. of Cost	Amount						
	General Expense										
	Office Expense										
	Furnace Expense										
	Converter Expense										
	Total Operating Expense										
	Construction										
	Fire Clay Quarry. Silica Quarry										
	Grand Total										
	Furnace No. 1 in Operation Days of 24 Hours										
	3 4										
	4										
	5										
	6 Trans West One Threated										
	Tons Wet Ore Treated or per Day per Furnace										
	Dry										
	" Wet " " per Day (actual time) Furnace No. 1										
	2 3										
	3 4										
	1 Dry 1 1 1 1 1 1 1 1 No. 1										
	" Dry " " " No. 1										
	2 3										
	3 4										
	5										
	5 1 Di		6								
	Pounds Blister Copper Produced		or	per	Day						
	Fine										
	" " per Ton Dry Ore Treated or %										
	Tons Wet Ore Treated per Ton of Coke	e Consumed	<u>i</u>	01							
	Diy			0							
	Tons Coke Consumed Furnace		nverter		or per Day						
	Tons Steam Coal Consumed or per Day										
	Brls Fuel Oil Consumed or " "										
	Tons Fire Clay Consumed				r per Ton						
	Tons Silica Rock " or " "										
	Tons Lime Rock " or " "										
	% of Moisture in Ore Treatment, C & A S & P Cole S & P JCT										
	Average Slag Assay										
	Total Cost per Ton of Wet Ore Treated	d									
	Average Number of Men Employed										
	Average Rate per Day no										
	" " " not including	Office									
	Tons of Wet Ore smelted per Man	0	r		per Day						
	" Dry " " "	0									

F1g. 135.

Days	Rate	Amount	Amount	Total
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	 	l	 	
		 	 	
1	1	I	1	1
		Days Rate	Days Rate Amount	Days Rate Amount Amount

Fig. 136.

FURNACE EXPENSE	Days	Rate	Amount	Amount	Total
General Foreman	_				
Foreman			i		
Feeders	_		<u> </u>		
Tappers			i		
Tappers Helpers			i		
Slag Men			i		
Laborers					
Masons			i		
Gen. Supplies Elect.					
and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Demurrage on Coke			1		
Coke					
Power House for Blast					
Delivering Ore and Coke Expense					
Briquetting Press Expense			i		
Hauling Slag Expense					
Unloading Ore Expense					
Total					
CREDIT					
Sales Old Brass castings			·		
NET			í ———		
CONVERTER EXPENSE				-	
General Foreman	─				
Foreman					
Skimmers					
Punchers					
Moulders					
Masons					
Laborers					
Gen. Supplies Elect.					
and S Lumber					
P and F Oils					
Machy. Tools	-				
Mach. Shop Bks.					
Carpt. Elect.					
Coke			 -		
Power House for Blast			 		
Mud Mill Expense					
Crane Expense	_				
Loading Bullion Expense	-				
Loss on Silicious Ore (lining)					
Total					
Credits, Sales of Scrap Iron					
Profit on Silica Sold			l		
Profit on Ore Used as Lining			!i		
			1		

Fig. 137.

LABORATORY EXPENSE Chemist Asst. Chemist Laborers Gen. Supplies Elect. I and S Lumber P and F Oils Machy. Tools Mach. Shop Bks. Carpt. Elect. Determinations @ Charged to General Expense BOILER HOUSE EXPENSE	Days	Rate	Amount	Amount	Total
Asst. Chemist Laborers Gen. Supplies Elect. I and S Lumber P and F Oils Machy. Tools Mach. Shop Bks. Carpt. Elect. Determinations @ Charged to General Expense					
Asst. Chemist Laborers Gen. Supplies Elect. I and S Lumber P and F Oils Machy. Tools Mach. Shop Bks. Carpt. Elect. Determinations @ Charged to General Expense					
Laborers Gen. Supplies Elect. I and S Lumber P and F Oils Machy. Tools Mach. Shop Bks. Darpt. Elect. Determinations & Charged to General Expense					
Gen. Supplies Elect. I and S Lumber P and F Oils Machy. Tools Mach. Shop Bks. Carpt. Elect. Determinations @ Charged to General Expense		1			
I and S Lumber P and F Oils Machy. Tools Mach. Shop Bks. Carpt. Elect. Determinations @ Charged to General Expense					
P and F Oils Machy. Tools Mach. Shop Bks. Carpt. Elect. Determinations @ Charged to General Expense					
Machy. Tools Mach. Shop Bks. Carpt. Elect. Determinations @ Charged to General Expense				i	
Mach. Shop Bks. Carpt. Elect. Determinations @ Charged to General Expense		 	 -		
Carpt. Elect. Determinations @ Charged to General Expense					
Determinations @ Charged to General Expense					
Charged to General Expense				l ———	
Foreman			 		
Fireman		l			
Asst. Fireman		 	 		
Laborers					
Masons					
Gen. Supplies Lumber					
I and S Oils P and F Tools					
			l		
		ļ			
Dumurrage		ļ			
Mach. Shop Bks.					
Carpt. Elect.					
	·				
Total					
Per Cent. Charged to Loading Bullion					
Per Cent. Charged to Power House Expense					
Per Cent. Chgd. to Delivering Oil and Coke			<u> </u>		
POWER HOUSE EXPENSE					
Engineers		├			
Dilers				 	ļ
Oilers Pumpmen			ļ	 	
		 		l ———	
Laborers Gen. Supplies Elect.		<u> </u>			
		 		ļ	
		 			
		ļ			
Machy. Tools					
Mach. Shop Bks.			ļ	ļ	
Carpt. Elect.	 	ļ	 	ļ	
Boiler House for Steam		ļ	ļ		
Total		 	l		<u> </u>
Per Cent. Charged to Furnace Expense	— —	 	l		
Per Cent. Charged to Furnace Expense Per Cent. Charged to Converter Expense	I	 	 		
Per Cent. Charged to Converter Expense Per Cent. Charged to Electric Plant		 	 		ļ
		ļ		l	
Per Cent. Charged to Pumping Plant			<u> </u>		
Per Cent Charged Delivering Oil and Coke.		 			
Gallons Engine Oil Used per Day Gallons Cylinder Oil Used per Day					

DETAILS OF EXPENSE							
DELIVERING ORE & COKE EXPENSE	Days	Rate	Amount	Amount	Total		
Foreman							
Elevator Men							
Charge Wheelers							
Laborers							
Gen. Supplies Elect.							
I and S Lumber							
P and F Oils							
Machy. Tools	.						
Mach. Shop Bks.							
Carpt. Elect.		_					
Boiler House for Steam							
Tons Wet Ore to Furnace .							
" Coke "		L					
" Briquettes "							
" Slag					ļ		
Lime Rock							
" Delivered at per Ton							
LOADING BULLION EXPENSE							
Laborers	-						
Gen. Supplies Elect.							
I and S Lumber							
P and F Oils							
Machy. Tools	<u> </u>				_		
Mach. Shop Bks.							
Carpt. Elect.							
Boiler House for Steam							
Loading, Tons Bullion @ per Ton							
Charged to Converter Expense							
	1						
BRIQUETTING PRESS EXPENSE							
Foreman	┪——	 	l				
Feeders	-	ļ					
Laborers							
Gen. Supplies Elect.				ļ			
I and S Lumber					ļ		
P and F Oils	·						
Machy. Tools	 						
Mach. Shop Bks.	 						
Carpt. Elect.	-						
Elect. Plant for Power				1			
Elect. I Bitt for I Ower		 					
For Briquetting Tons of	 	 			 		
			ļ	 			
Briquettes @ per Ton				 			
Average Conner		 	 	 	 		
Average Copper		 	 				

Fig. 139.

DETAILS OF EXPENSE PUMPING EXPENSE Rate Days Amount Amount Total Pumpmen Laborers Gen. Supplies Elect. I and S Lumber P and F Oils Machy. Tools Machy. Shop Bks. Carpt. Elect. Power House for Steam MUD MILL EXPENSE Foreman Runners Liners Liners Helpers Laborers Gen. Supplies Elect. I and S Ōils P and F Lumber Machy. Mach. Shop Tools Bks. Carpt. Elect. Demurrage Elect. Plant for Power For lining Converters @ each Tons Fine Copper made per Lining CRANE EXPENSE Crane Man Chasers · Laborers Gen. Supplies Elect. I and S Lumber P and F Oils Machy. Mach. Shop Tools Bks. Carpt. Elect. Elect. Plant for Power Charge to Converter Expense

DETAILS OF EXPENSE								
HAULING SLAG EXPENSE	Days	Rate	Amount	Amount	Total			
Runners								
Runners Helpers	-				 			
Laborers	-							
_				l	 			
Gen. Supplies Elect.	-							
I and S Lumber					<u> </u>			
P and F Oils				<u> </u>				
Machy. Tools								
Mach. Shop Bks.				l				
Carpt. Elect.								
Elect. Plant for Power								
For Hauling Pots Slag@ each	L			[<u>'</u>				
Charge to Furnace Expense				I				
REPAIRS OF BUILDINGS								
Painters	∤ -			 	l			
Laborers	-	ı——		l!	 			
Masons	\vdash	 						
Gen. Supplies Elect.		l 						
I and S Oils	-				i			
P and F Lumber	1			ı——-!				
Machy. Tools	.	ı——		ı——-I				
Mach. Shop Bks.	1			ı 				
Carpt. Elect.	\vdash							
Carps. Diecs.					l			
Charge to General Expense								
	 							
REPAIRS OF DWELLINGS	Ĺ				i			
Painters	TI							
Laborers	L			/	<u> </u>			
Masons	I1							
Gen. Supplies Elect.	LI							
I and S Oils	l i							
P and F Lumber	ļ[\longrightarrow						
Machy. Tools	lI		[
Mach. Shop Bks.	II			. ————				
Carpt. Elect.	I I		I	. ———}				
	LI							
Charge to General Expense	<u> </u>							
LIGHTING EXPENSE	1 1			. 1	ı			
Laborers	1							
Gen. Supplies Elect.								
I and S Lumber	<u> </u>							
P and F Oils								
Machy. Tools								
Mach. Shop Bks.		<u> </u>						
Carpt. Elect.		\rightarrow		t				
	 1							
Electric Plant for Power	-							
2000010 2 1000 100 100 100	-	i						
			_					

Fig. 141.

WAREHOUSE EXPENSE	Days	Rate	Amount	Amount	Total
Supply Clerk					
Asst. Supply Clerk	 				
Laborers					
Gen. Supplies Elect.	 				
and S Lumber	 				
P and F Oils	· · · · · ·			-	
Machy. Tools	 				
Printing	-				
Mach. Shop Bks.	1				
Carpt. Elect.					
Charged to General Expense					ļ
ELECTRIC PLANT EXPENSE	-l				
Laborers	-				
O C	-	ļ			L
Gen. Supplies Elect. I and S Lumber	-	 			<u> </u>
P and F Oils					
Machy. Tools	-	 			<u> </u>
Mach. Shop Bks.		_			ļ
Carpt. Elect.		 			<u> </u>
Power House for Power	- 	 			
Total		 			
Per Cent. Charged to Mud Mill	 				
Per Cent. "Crane Expense					
Per Cent. " Hauling Slag					
Per Cent "Briquette Press Exp.					
Per Cent. " Lighting Expense					
Per Cent. " Mach. Shop Expense			l		
Per Cent. "Pumping					
ENGINEERING EXPENSE			<u> </u>		
Engineers	.				
Laborers	-		ļ		
Supplies Mark Share Plan			ļ ——	<u> </u>	
Mach. Shop Bks. Carpt. Elect.	-}		<u> </u>		
Carps. Elect.	-		ļ		<u> </u>
Change to Consent Fernance		 	 -		
Charge to General Expense ORE SAMPLING EXPENSE		-			
Foreman	-	 			
Samplers	-			ļ	
Laborers	-		 		
Supplies	-		 		
Shops					
Switching to and from Sampler	-		 		
Authorne M and nom Dambier	-	 	 		
Charged to Sundries				 	
UNLOADING ORE EXPENSE	-	 			
Laborers	+	 	 		

Fig. 142.

MACHINE SHOP EXPENSE	Days	Rate	Amount	Amount	Total
	 				
Supt. of Machinery	_				
Master Mechanic	-	l			ļ
Machinists	-	L			
Machinists Helpers	_				
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					ļ
Machy. Tools Carpt. Shop Elect.		_			
					•
Bks.	-				
Elect. Plant for Power					ļ
Charged to Sundries		<u> </u>			
BLACKSMITH SHOP EXPENSE		1			l
Foreman					
Blacksmiths					
Helpers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Elect.					
Carpt.					
Charge to Sundries					
CARPENTER SHOP EXPENSE					
Foreman	-				
Carpenters				ļ	
Helpers				<u> </u>	l
Gen. Supplies Elect.					
I and S Lumber	-			l	
P and F Oils				ļ	
Machy Tools	-├				
Mach. Shop Elect.					
Bks.					
		 		I	
Charge to Sundries			<u> </u>		
ELECTRICAL SHOP EXPENSE					
Foreman		l			
Electricians					
Helpers	_				
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Elect.					
Carpt. Bks.					
Charged to Sundries					
		T			

Fig. 143.

	- 	201111	ACCOUNT			
Dr.					Cr.	
	Balance	19	Smelter	Expense		
	Purchases		Construc	tion		
			GL			
	Labor		Shops			
	Shops		Sales and	Refunds		
	C and A Mng.	Co.	Pay-roll	Deductions		
	Fire Clay Qua	rry	C and A	Mng. Co.		
	Silica Quarry		C Q Mng			
			Ore Purc			
—- 	_		OreTure	nases		
			Balance	19		
			General I and S			
			P and F			
	-		Machy.			-
			Elect.			
			Lumber			
			Oils			
	-		Tools			
		-	Fuel			
			Ore Purc	hases		
			Total			
		COKE	ACCOUNT			
	Balance	19	Smelter	Expense		
	Purchases		Refunds			
	Labor		C and A	Mng. Co.		
			- 0 0 W			
	-		C Q Mng	, Co.		i ——
			Balance	19		
			- Duminec			
			1			Ĺ
STA	TEMENT OF PAY	-ROLL A	ND BILLS	S AUDITED A	CCOUNTS	
			Gross	Deductions	Net	
y-roll			-			
ls Audited						
				1		

Fig. 144.

CASH ACCOUNT				
Balance on hand 19				
C. & A. Mng. Co. Bisbee	-	-		
Unclaimed Checks canceled				
Labor Balance Pay-roll		[
-				
Labor Account Pay-roll				
		[
Balance on hand 19				
MEMORANDUM OF ACC	OUNT			
=				
Balance as per Cash Account	-	-		
Checks Outstanding				
Balance as per Bank Statement				
STATEMENT OF ORE SMI	ELTED	<u>-</u>		
	Wet Ton	s	Dry Tons	
C & A Ores = Oxides				
Oxide L. G. Sulphide			 -	
S. & P. Ores = Cole Oxide				
Cole Sulphide				
Junct. Oxide				
Junct. Sulphide Host Oxide		-		
Hoat Sulphide		—-I·		
Wet Tons H20 Dry tons		— -		
Total C. & A. Ores				
Total S. & P. Ores				
		— 		
Total Tons				
Average per Day				

Fig. 145.

~	Weight	(Tons)	Assay		1	ts		
Shipper	Wet	Dry	Au.	Ag.	Cu.	Gold Os.	Silver O	s. Copper Lbs
	-							
	-					 		
								-
· · · · · · · · · · · · · · · · · · ·								
								_
				∤		ļ		_
	-					-		
				l		1		-
Total				<u> </u>	l	ļ		
	Gold @					-		
	Silver @ Copper @	<u>a</u>					-	
1108.	Сорры е	-		:-		 		·
		Total						
COST: Paid	Shipper							
Froi	ght, etc.					·	-	
1100	July 000.					 		
						-		
Net profit on " per			Dry ton	8		-	l	
per						·	(
	s	ILICIOU	S-ORE	-TREAT	ED (C	onverter Li	ning)	
		Wet	H20		Dry	T	1	
Cost:								
		ons at			per ton	-		
Values:	age price	fine conv				-		
	freight, e					-		
Less								
Less			rage cor	pper				
Less	Dry t	tons, ave						
Less	Oz. S	ilver at			per oz.			
Less	Oz. S	ilver at Copper a			per oz. per Lb.			
Less	Oz. S	ilver at						
Net	Oz. S	ilver at						
	Oz. S Lbs.	on per ton	t	t	per Lb.			
Net	Oz. S Lbs.	on per ton	t	t	per Lb.			
Net	Oz. S Lbs.	on per ton	t	t	per Lb.			
Net	Oz. S Lbs.	on per ton	t	t	per Lb.			
Net	Oz. S Lbs.	on per ton	OTAL 1	t	per Lb.			
Net	Oz. S Lbs.	on per ton	OTAL 1	t	per Lb.			

Fig 146.

CHAPTER IV

MINING COAL AND MAKING COKE

ACCOUNTING METHODS OF THE UTAH FUEL COMPANY

The Utah Fuel Company own the Pleasant Valley Coal Company Wasatch Store Company. The Utah Fuel Company operates the Sunnyside Mine

Somerset Mine.

The Pleasant Valley Coal Company operates the Winter Quarters Mine

Castle Gate Mine Clear Creek Mine Utah Mine.

Coke is manufactured at the

Castle Gate Mine Sunnyside Mine.

The Wasatch Store Company have stores located at the various mines which do a general mercantile business with the employees of the company.

These mines are opened by slopes, from the foot of which the main entries are driven. The coal lies on a general dip, with local variations, sometimes quite sharp but not extensive. The main entries though not driven to follow the strike are quite level, being straightened up by filling and cutting after the adjacent coal is out. Butt entries are driven from the main entry and rooms turned each way from the out butts.

The coal is broken down in the rooms and loaded in cars to be hauled to the main entry by mules. It is taken by electric locomotives there made up into trains and run to the tipple, where the coal is crushed and screened, the various grades being run into separate bins. From these bins it is loaded into railroad cars for shipment.

The coke is made from slack coal delivered from the mine and manufactured in ovens. From these ovens it is loaded directly into railroad cars for shipment to consumers.

COST OF COAL AND COKE TO THE CONSUMER

	Profit and loss			Administrative	Freight Co	Coal and Coke at Mines	Profit on Sales
Admin	inistrative	Operating	Earnings	Insurance	General Expense		
General Expense	Insurance	Coal Expense		Taxes Rovalties	Salaries		
Salaries	Тахев			Depreciation	Rents		
Law	Royalties			Personal Injuries	Stationery, etc.		
Rents	Depreciation			Prospecting	General Exp.		
Stationery, etc. General Exp.	Personal Injuries Prospecting			Interest Rents			
	Interest, etc. Rents						
		,		Coke Expense	95	Coal Expense	98
				Coal Used	ı	Mining	ı
				Superintend	Superintendence and Clerks	Hauling	
				Engineering		Loading	
				Charging Ovens	Vens	Repairs to Cars	Cera
				Burning and Drawing	d Drawing	Repairs to Tracks	Tracks
				Loading Coke	re Le	Electric Lights	thte
				Loading Cinders	ders	Entry Driving	gui
				Firing Cold Ovens	Ovens	Rooms and Rolls	Rolls
				Repairs to Coke Ovens	Zoke Ovens	Ventilation	
			•	Repairs to Buildings	Suildings	Drainage at	Drainage and Watering
				Coke Experiments	iments	Timber and Props	l Props
				Incidentals		Dead Work	•
						Repairs to Buildings (Repairs to Machinery	Repairs to Buildings and Chutes Repairs to Machinery
						Superintenc	Superintendence and Clerks
Norm.—Accounts	underlined are debited with the items below	with the items	below			Engineering	₩
Dem, which may be consumer refers to	Whem, which may be sub-accounts or direct charges. Consumer refers to dealers buying from the mines.	charges. e mines.				General Expense Incidentals	egued:

GENERAL OFFICE LEDGER ACCOUNTS

General led	ger accounts	Acc	ounts, auxiliary records	Closed account
1. Cost of Prop 2. Lands 3. Mine Develo 4. Tramways, 0 5. Buildings 6. Power and M 7. Cars and Tra 8. Coke Ovens 9. Boarding H 10. Saloon Build 11. Machinery f 12. Earnings 13. Mine Expen 14. Coke Expen 15. General Exp 16. Boarding H 17. Boarding H 18. Rents 19. Insurance 20. Taxes	pment Chutes and Trestles Machinery acks ouse Fixtures dings or Prospecting se seense ouse Expenses	13. (1. Expense of Mining 2. Hauling 3. Loading 4. Repairs to Cars 5. Repairs to Tracks 6. Electric Light 7. Entry Driving 8. Rooms and Rolls 9. Ventilation 10. Drainage and Watering Mine 11. Timber and Props 12. Dead Work 13. Repairs to Buildings 14. Repairs to Machinery 15. Superintendence and Clerks 16. Engineering 17. General Expense	Power House
21. Personal Inj 22. Coal Prospec 23. Depreciation Plant, etc. 24. Interest, Dir change 25. Vouchers 26. Pay Rolls 27. Treasurer 28. Unclaimed V 29. Depreciation 30. Material and 31. Engineering 32. Pay-roll Def 33. Personal Inj 34. Animals Kil 35. Special Rend 36. Individuals and 37. Water Supp 38. Smithing 39. Saw Mill 40. Depreciation 41. Profit and L	wages A Account Supplies Property iciency ury Fund led and Sold ewal Fund and Companies ly of Animals	14.	18. Incidentals 40. Coal Used 41. Superintendence and Clerks 42. Engineering 43. Charging Ovens 44. Burning and Drawing 45. Loading Coke 46. Loading Cinders 47. Firing Cold Ovens 48. Repairs to Coke Ovens 49. Repairs to Buildings 50. Coke Experiments 51. Incidentals	•

GENERAL LEDGER ACCOUNTS

1. Cost of Property.—This account represents the total amount of the capital accounts for all mines of the company:

Lands Power and Machinery
Mine Development Cars and Tracks
Tramways, Chutes and Trestles Coke Ovens.
Buildings

These accounts are closed into Cost of Property each month by Journal entry.

2. Lands.—Representing the total cost of mining property, including all legal expenses in connection with acquiring the same, and any expense incurred for surveys and examinations, also preliminary prospecting of the property either before or after purchase.

This account represents the total cost of all lands owned by the company. It is closed into Cost of Property by Journal entry.

3. Mine Development.—Representing the total cost of developing all mines of the company until such time as they are placed on a producing basis except that when buildings and equipment of a permanent nature are erected or installed during the development stage, the expense thereof will be charged to the proper capital accounts.

All earnings from the sale of product during the development stage of a mine will be credited to this account. This account is closed into Cost of Property.

- 4. Tramways, Chutes and Trestles.—Representing the total cost of all permanent Tramways, Chutes, Trestles, Scales, Tipples, Screens, etc., for all the mines of the company. This account is closed into Cost of Property.
- 5. Buildings.—Representing the total cost of all permanent buildings for all mines of the company. This account is closed into Cost of Property.
- 6. Power and Machinery.—Representing the total cost for all mines of the company, of Machinery, Shop Tools, Power Equipment, Horses, Mules, Harness, etc. This account is closed into Cost of Property.
- 7. Cars and Tracks.—Representing the total cost for all mines of the company, of mine cars, coke oven larries, tracks, etc., except that when a mine is on a producing basis the maintenance of the above mentioned equipment and extensions of the track, are charged to operating expense. This account is closed into Cost of Property.
- 8. Coke Ovens.—Representing the cost of all ovens of the company at the different mines and the equipment of the same. This account is closed into Cost of Property.
 - 9. Boarding House Fixtures.—Representing the total cost for all

mines of the company, of the Boarding house furniture, stoves, ranges, cooking utensils, beds and bedding, etc. This account is not intended to cover repairs and replacements of equipment which are charged to operating account of Boarding House.

- 10. Saloon Buildings.—Representing the cost of all buildings and the necessary fixtures which have been purchased or erected by the company for use as saloons.
- 11. Machinery for Prospecting.—Representing the cost of portable machinery which is used in prospecting, such as Diamond Drills, Hoists, Pumps, etc., all the above are charged to the company in general, and not to any particular mine.
- 12. Earnings.—This account represents the income from the sale of all Coal and Coke, and is charged with the expense of delivering Coal and Coke sold to the mines locally, also with any overcharges in price for Coal and Coke shipped. The account covers all mines of the company.
- 13. Mine Expense.—This account represents the total operating expenses for all Coal mine operations of the company. It is made up of the following accounts as shown by the mine records.

A. Mining J. Drainage K. Timber and Props B. Hauling L. Dead Work C. Loading M. Repairs to Buildings and Chutes D. Repairs to Cars E. Repairs to Track N. Repairs to Machinery F. Electric Light O. Superintendence and Clerks G. Entry Driving P. Engineering H. Rooms and Rolls Q. General Expense I. Ventilation R. Incidentals.

14. Coke Expense.—Representing the cost of operating the coke ovens of the company and is made up of the following accounts as shown on the mine records

A. Coal Used

B. Superintendence and Clerks
C. Crushing and Elevating
D. Charging Ovens
E. Burning and Drawing
F. Loading Coke

G. Loading Cinders
H. Firing Cold Ovens
I. Repairs to Coke Ovens
J. Repairs to Buildings
K. Coke Experiments
L. Incidentals.

- 15. General Expense.—This account comprises the following sub-divisions:
 - A. General Office, Salaries and Expenses, covering the salaries of officers and clerks, Directors fees and expenses, office expenses, etc.
 - B. Law Expense.—To cover the salaries and expenses of attorneys, engaged in company business and not chargeable to

- some specific account. Legal expense incurred on account of Personal injuries will be charged to the Personal Injury Fund
- C. Rents.—To cover the rental of the general offices of the company.
- D. Stationery and Printing.—To cover the cost of stationery, books and supplies used at the general offices of the company.
- E. General Expense.—To cover advertising and such other sundry items as are not covered by the preceding accounts.
- 16. Boarding House Expenditures.—This account covers the cost of operating all boarding houses of the company.
- 17. Boarding House Receipts.—To cover all receipts for board furnished by all company boarding houses.
- 18. Rents.—This account represents the gross rentals from all houses owned by the company, less maintenance charges against the same.
- 19. Insurance.—The total amount of insurance premiums payable in each year is charged to this account. This amount is pro-rated one-twelfth each month. When the Insurance premiums are paid they are charged to Insurance account. Whenever a loss occurs by fire, a charge is made against the insurance company for the amount of loss and Property Destroyed account is credited. When the claim is settled if the full amount is not allowed, the difference is charged to an expense account.
- 20. Taxes.—The estimated amount of taxes payable each year is charged to this account and credited to Accrued Taxes account, prorated one-twelfth each month. When taxes are paid they are charged to Accrued Taxes account. Any adjustment necessary is made in charging out the final installments.
- 21. Personal Injury Claims.—This account is charged each month with an amount that is estimated to cover all claims for personal injuries and death from accident that are likely to occur during the year. Personal Injury Fund is credited with this amount and when settlements are made with individuals the amounts are charged to the Personal Injury Fund.
- 22. Prospecting.—This account is to cover all expenses incidental to the prospecting of Coal land both before and after purchasing. When lands which have been prospected are purchased the amount so expended will be charged to the cost of Lands, and credited to this account.
- 23. Depreciation of General Plant Account.—This account represents the amounts charged off each month and year for depreciation of property and plant, and this account is charged out to income each year, and appears on the Financial Statement each month as a charge to Income. The amounts charged to this account each month are credited to Depre-

ciation account, which remains on the books and is generally deducted from the total of the capital accounts or Cost of Property in making up the balance sheet.

- 24. Interest Discount and Exchange.—This account represents all interest received and paid, exchange paid and discounts taken.
- 25. Vouchers.—The total amount of vouchers for the month, as shown by the Abstract of Vouchers, is credited to this account, and charged to the accounts for which expenditures are made, as shown by the distribution in the Abstract of Vouchers. When Vouchers are paid, the Treasurer's account is credited and Voucher account is charged.
- 26. Pay-roll.—This account is credited with the gross earnings as shown by the Pay-roll Distribution, and charged with sundry pay-roll deductions, and when the net amount of the roll is paid by the Treasurer, the Pay-roll account is charged and the Treasurer is credited.
- 27. Treasurer.—This account is handled by the Auditor just the same as one would handle the cash account in case there was no treasurer of the company, in other words, the Treasurer is responsible for the cash, and is credited with all receipts and charged with all disbursements.
- 28. Unclaimed Wages.—Employees wages which are not called for on pay day (paid out), are placed to the credit of this account, and when the wages are claimed and paid out this account is charged.
- 29. Depreciation Account.—This account is credited each month with the amount charged to Depreciation of General Plant account, and the amounts set up to the credit of this account are usually allowed to remain on the books, and in making up the balance sheet the total of this account is deducted from the Cost of Property, before showing the same.
- 31. Engineering Property.—Covers all Transits, Levels, Rods, Tapes, Drawing Instruments, etc., all equipment for the engineering department.
- 32. Pay-roll Deficiency.—This account is intended to cover pay-roll overdrafts which are charged to this account. When the overdrafts are collected on the following month's pay-roll, this account receives credit.
- 33. Personal Injury Fund.—An estimated yearly amount to cover claims for personal injuries and deaths from accidents while in the company's employ is pro-rated one-twelfth each month into Personal Injury Claims and credited to this fund. When claims are paid they are charged to this account.
- 34. Animals Killed and Sold.—When an animal is killed or sold its value is credited to this account and charged to Hauling. Animals purchased to replace those killed or sold will be charged to this account.
- 35. Special Renewal Fund.—This account is credited with income from the sale of old material, scrap metal, etc. Charges to this account are for renewals to plant, etc.

- 36. Individuals and Companies.—Coal Sales. This account represents the accounts receivable from the sale of Coal and Coke, the detail accounts for which are kept in Individuals and Companies Coal Sales Ledger. The General Ledger carrying only the controlling account or total amount. Individuals and Companies Bills Collectable cover accounts receivable as per Bills Collectable Ledger.
- 37. Water Supply.—This account is charged with all expense, both labor and supplies for the operation of the water supply plant. This account receives credit for water furnished the various plants.
- 38. Smithing.—This account is charged with labor and supplies and receives credit for labor performed.
- 39. Saw Mill.—This account is charged with all labor and supplies to operate and maintain the mill and plant, it receives credit for all lumber, etc., used on a basis of cost per 1000 ft.
- 40. Depreciation of Animals.—The original cost of all mules and horses is written off in monthly installments, based on the average life of an animal in mine work. This depreciation charge is made to the Hauling account and credited to this account.
- 41. Profit and Loss.—Into this account are closed the operating and income accounts of the company.

COAL EXPENSE SUB-ACCOUNTS-AUXILIARY RECORDS

- 1. Expense of Mining.—This account comprises all expense of mining, loading, tramming, tools, etc., and is sub-divided as follows:
 - A. Hand Mining
 - B. Contract Mining Machine
 - C. Day Work Mining Machine
 - D. Drilling, Shooting and Loading
 - E. Loading company Coal
 - F. Power house, proportion
 - G. Ladders and Tool Boxes
 - H. Running Man trip
 - I. Sharpening Tools

- J. Powder Man
- K. Check Man
- L. Wire Man
- M. Shot Inspectors
- N. Wood Pulp
- O. Earth Tamping
- P. Tamping and Powder Boxes
- Q. Interpreter.
- 2. Hauling.—This account is made up of the following sub-divisions:
- A. Power house, proportion
- B. Drivers
- C. Outside Hoistmen
- D. Underground Hoistmen
- E. Locomotive Men
- F. Rope Runners
- G. Couplers and Spraggers
- H. Roller Men-Greasers
- I. Stable Expense, proportion

- J. Harness Repairs and Shoeing
- K. Cleaning up Wrecks
- L. Repairs to Haulage Signals
- M. Clearing Haulage Tracks
- N. Oil and Waste
- O. Roller Repairs and Renewals
- P. Repairing Haulage Entries
- Q. Loss of Animals
- R. Depreciation of Animals.

3. Loading.—This account com	prises the following sub-divisions:
 A. Outside Foreman's salary B. Weighmen and Topmen C. Pushers and Dumpers D. Couplers and Spraggers E. Power House, proportion F. Running Chute engine G. Loading by day labor H. Loading by contract 	 I. Running and Repairing Box-car loader J. Car handlers K. Attendance Elevator Screens, etc. L. Cost of Dummy Doors M. Unloading Dust and Yard Waste N. Clearing Yard Tracks O. Damage to R. R. Cars and Tracks.
4. Repairs to Cars.—This account	${\bf comprises the following sub-divisions:}$
A. Repairing Wrecked cars B. Repairing Worn-out cars	C. Replacing lost carsD. Replacing wheels and Axles.
5. Repairs to Track.—This acc divisions:	ount comprises the following sub-
A. Hoist and Locomotive tracksB. Entry and Room TracksC. Taking up old rails and tiesD. New ties used	E. New railsF. Rail fastenings and SpikesG. Old rails used.
6. Electric Light.—This account c	omprises the following sub-divisions:
A. Power house, proportion B. Repairs to Interior Wiring	C. Replacing Lamps outside D. Replacing lamps in the mine.
7. Entry Driving.—This account of	comprises the following sub-divisions:
A. Yardage in straight CoalB. Yardage in Coal and RockC. Yardage in straight Rock	D. Allowance for boney Coal or rockE. Allowance for rollsF. Allowance for water.
8. Rooms and Rolls.—This accidivisions:	count comprises the following sub-
A. Rooms turnedB. Allowance for Rolls in roomsC. Allowance for Brushing Roof	D. Allowance for boney Coal or Rock E. Allowance for water.
9. Ventilation.—This account co	omprises the following subdivisions:
 A. Power house, proportion B. Gas and Air Inspectors C. Fan expense and Engineers D. Building and Repairing Stoppings E. Brattice Cloth and Bratticing 	 F. Building and Repairing Mine doors G. Trappers H. Cleaning Air Ways I. Repairing Air Ways.
10. Drainage and Watering M following sub-divisions:	ine.—This account comprises the
A. Power house, proportion B. Outside pumpmen and pumps	D. Watermen and Supplies E. Ditches and Sumps.

C. Inside pumpmen and pumps

11.	Timber	and	Props.—This	account	comprises	the	following	sub-
division	ns:				_		_	

- A. Driving Entries and Rooms
- B. Retimbering and Robbing Rooms F., Hauling and Sowing
- C. Repairing Haulage entries
- D. Repairing Air and Traveling H. Drawing Props. Ways
- E. Unloading and Piling
- G. Loading and delivering

12. Dead Work.—This account comprises the following sub-divisions:

- A. Retimbering Rooms
- B. Regrading and Brushing entries
- C. Prospecting Faults
- D. Loading and Hauling Rock
- E. Dumping and stowing rock
- F. Underground Inspection
- G. Replacing Tools and Repairing
- H. Cleaning Camp.

13. Repairs to Buildings and Chutes.—This account comprises the following sub-divisions:

- A. Main Chute and Trestle
- B. Crusher Elevator and Screen F. Boarding House building
- C. Power and Boiler House
- D. Engine House

- E. Barn and Corrall buildings
- G. Blacksmith and Machine shops
- H. Other mine buildings
- I. R. R. Tracks and Mine scales.

14. Repairs to Machinery.—This account comprises the following sub-divisions:

- A. Boilers and Connections
- B. Steam Lines
- C. Stationary steam engines
- D. Steam hoisting engines
- E. Electrical hoisting engines
- F. Air compressors
- G. Electric Generators
- H. Electric Locomotives
- I. Electric Motors
- J. Outside pumps
- K. U. G. Pumps
- L. Outside Water lines
- M. U. G. water lines
- N. Outside Air lines

- O. U. G. Air lines
- P. Outside Electric Power lines
- Q. U. G. Electric Power lines
- R. Fans and Fan engines
- S. Crushers, Elevators, etc.
- T. Tipples and Screens
- U. Renewal of Wire rope
- V. Mining Machines
- W. Machinery inspection
- X. Telephone lines
- Y. Wagons
- Z. General Master Mechanic, proportion salary.

15. Superintendence and Clerks.—This account comprises the following sub-divisions:

- A. General and Mine Superinten-
- B. Mine foreman's salary

C. Outside expense.

- C. Mine Clerk's salary. dent's salary, proportion
- 16. Engineering.—This account comprises the following sub-divisions:
- A. Mine surveyors and assistants
- B. Office supplies

MINING COAL AN	/D MAKING COKE 213
17. General Expense.—This accidivisions:	count comprises the following sub-
A. Stationery and Printing, pro- portion	C. Sundry supplies D. Office fixtures
B. Janitor service	E. Firing office heater.
18. Incidentals.—This account c	omprises the following sub-divisions:
A Miss Teaming	F Watahman

- A. Misc. Teaming
- B. Pav Dav expenses
- C. Expense on money
- D. Free Coal

- E. Watchman
- F. Guard and Special service
- G. Rescue apparatus.
- COKE EXPENSE SUB-ACCOUNTS-AUXILIARY RECORDS
- 40. Coal Used.—To cover the cost of Coal used in making coke.
- 41. Superintendence and Clerks.—This account comprises the following sub-divisions:
 - A. General and Mine Supt., salary, C. Office Clerk's salary, proportion proportion
 - B. Coke Oven Foreman's salary
- D. Office supplies, proportion
- E. Timekeeper.
- 42. Engineering.—This account comprises the following sub-divisions:
- A. Mine surveyors and assistants, proportion
 - B. Office supplies, proportion
 - C. Outside expense, proportion.
- 43. Charging Ovens.—This account comprises the following subdivisions:
 - A. Power house, proportion
 - B. Handling coal at Bins
 - C. Clearing at Bins and Scales
 - D. Weighing charges
- E. Running Larry cars
- F. Repairing Larry Cars and Tracks
- G. Repairing Power and Motor lines
- H. Repairing Scales.
- 44. Burning and Drawing.—This account comprises the following sub-divisions:
 - A. Coke pullers
 - B. Plastering Oven Doors
 - C. Power house, proportion
 - D. Pumping Expense, proportion
- E. Repairs to Coke oven water lines
- F. Repairing Tools
- G. Charging Hole Covers.
- 45. Loading Coke.—This account comprises the following subdivisions:
 - A. Loading R. R. Cars contract
 - B. Loading R. R. Cars, day labor
 - C. Car handlers
 - D. Clearing R. R. tracks
 - E. Damage to R. R. Cars and Tracks
- F. Tool expense and repairs
- G. R. R. Weighman
- H. Cost of Dummy doors
- I. Repairs to R. R. Track scales.

- 46. Loading Cinders.—This account comprises the following subdivisions:
 - A. Loading and Unloading R. R. C. Clearing docks

Cars

D. Tool expense and repairs

B. Hauling in wagons

- E. Stable expense, proportion.
- 47. Firing Cold Ovens.—This account comprises the following subdivisions:
 - A. Wood used

C. Charging, Burning and Drawing

B. Coal used

- D. Disposing of cinders.
- 48. Repairs to Coke Ovens.—This account comprises the following sub-divisions:
 - A. Brick and fire clay

D. Replacing ovens

B. Stone Lime, etc.

E. Repairs to dock walls.

- C. Iron door frames
- 49. Repairs to Buildings.—This account comprises the following sub-divisions:

A. Slack bins

D. Trestles and Bridges

B. Store and tool house

E. Supt. Office.

- C. Scale house
- 50. Coke Experiments.—This account comprises the following subdivisions:

A. Preparing and Coking coal

C. Cost of Analysis

B. Transportation on samples

- D. Repairs to laboratory equipment.
- 51. Incidentals.—This account comprises the following sub-divisions:

A. Pay day expense

D. Free coal

B. Watchman

E. Telephone service and repairs.

C. Janitor service

CLOSED ACCOUNT

Power House.—This account so-called comprises all the expenses to operate the power plants, both steam generators and steam driven engines, delivering power to the mine plant or workings as Air. Steam or Electricity.

While called an account it does not appear so on the books but is handled in this manner, all labor is charged to the account in the distribution of labor, and is distributed to the various accounts benefited by the steam plant on a basis of power used. This same idea is used in distributing supplies charged to the power house. Power house is merely a charging head under which the different items are gathered, the sum of the labor being further distributed on the same report, and the supplies further distributed on the supply report.

GENERAL OFFICE ACCOUNTING

Books.—Cash Book Journal General Ledger Coal Sales Ledger Bills Collectable Ledger Abstract of Bills Collectable Abstract of Vouchers.

The above are the most important books although there are detailed records covering all expenses kept in auxiliary records.

Cash Book.—The Cash Book is kept by the Treasurer of the company. who pays all bills and handles all finances. All youchers approved and passed through the company books are transmitted to the Treasurer for payment, by the Auditor. At the end of each month the Treasurer furnishes the Auditor with a detailed statement of all cash receipts and disbursements. This statement is journalized debiting and crediting the proper accounts.

Journal.—All journal entries must be signed by the Chief Clerk as correct and approved by the Auditor, before entered on the books.

Ledger.—The general ledger is kept in the usual way carrying the accounts as outlined in the forepart of this article.

Ledger Coal Sales.—This ledger is subsidiary to the General Ledger, account of Individuals and Companies Coal Sales, carrying the detailed accounts whereas the general ledger account carries the aggregate amount, or controlling account.

Ledger Bills Collectable.—This ledger is subsidiary to the General Ledger, account of Individuals and Companies, Bills Collectable, carrying the detailed accounts, whereas in the General Ledger the account is shown as a whole.

Abstract Bills Collectable.—This book is a journal in which are entered all Bills Collectable, debiting and crediting the proper accounts. These entries are posted in detail to the Bills Collectable ledger and in the aggregate to the general ledger, Individuals and Companies Bills Collectable account.

Abstract of Vouchers.—This book which is very large has various columns that are headed as follows in the rotation given:

Voucher Number

Favor of

Amount

Date transmitted to Treasurer

Date paid

Material and Supplies

Mine Expenses

General Expenses

Coke Expenses

Earnings

Rents

Depreciation of Animals

Personal Injury Fund

Individuals and Companies

Medical Dept.

Boarding house Expenditures

Boarding house Receipts

Saw Mill

Water Supply

Pay-roll Deficiency Smithing Account

Unadjusted Legal Expense

Unclaimed Wages

Profit and Loss.

Under each heading above given there are separate sub-heads for each mine. All Vouchers are entered in numerical order, and forwarded to the Treasurer for payment.

The following statements, etc., pass through the Voucher Abstract besides Vouchers.

Pay-rolls
Pay-roll Distribution
Pay-roll Deduction Report

Material and Supplies used report Abstract of Journal entries Abstract of Bills Collectable.

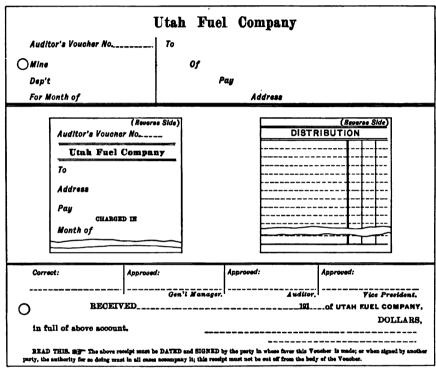


Fig. 147.—Form 1.

At the end of the month a recapitulation of the Abstract of Vouchers is made following the last entry for the month. As both debits and credits are entered in the Voucher Abstract for the different accounts, two colors of ink are necessary, black for the debits and red for the credits. The net totals of the recapitulation are posted to the General Ledger.

Invoices.—All invoices come to the Purchasing Agent who checks the prices and terms, after which they are forwarded to the proper mine to be checked by the supply clerk, as to receipt of material and for entry on the mine records, where they are charged to Material and Supplies or direct to accounts benefited, and then forwarded to the Auditor who vouchers them and passes them on to the Treasurer for payment. All invoices are entered in an Invoice Record by the Auditor, separate accounts being kept with each individual or company from whom material is purchased. This record is to group all transactions with each firm or individual for quick reference.

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2. Gener	al description	1					
<u> </u>	<u> </u>	====	===				
8. Repai	rs or renewal	8					
4. Neces	sity for same						
	ate of cost pe should be con	r detail attach	ed; Labor \$	м	at'l \$	Total \$	
<u> </u>	<u> </u>						
7. Lengt	h of time req	uired to compl	ete work				
8. To be	charged to a	count					
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Correct:			rect:	Gen'i Superintende		G	meral Manage
Correct:		rintendent.	TOTAL	Gen'l Superintende	nt	G	meral Manage TOTAL
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Correct:	MONTH	rintendent. EXPENDED			CHARGE	G D OUT	
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Correct;	MONTH	rintendent. EXPENDED			CHARGE	G D OUT	
	MONTH	rintendent. EXPENDED		MONTH	CHARGE	G D OUT	

Fig. 148.—Form 2.

Vouchers.—All invoices are Vouchered for payment. These Vouchers (Fig. 147) must be certified to as correct by the Chief Clerk and approved by the General Manager and Auditor before being passed to the Treasurer for payment. All Vouchers are entered in the Abstract of Vouchers and the charges distributed to the proper mines, under the various account headings shown in that book.

Extraordinary Expenses.—All Extraordinary Expenses which are estimated to cost \$100.00 or more, require the approval of the General Manager and General Superintendent. The method of handling these items is to make out at the mine an estimate of the required work on form 2 (Fig. 148) in quadruplicate, giving the details regarding the location and necessity of the work, also detailed estimates. These estimates pass through the General Superintendent to the General Manager for approval; after being approved the work may be started. The disposition of these forms is printed at the bottom of the form.

Utah Fuel Company Pleasant Valley Coal Company	Form 243	Appropriation No
ESTIMATE O	F IMPROVEN	MENTS, ETC.
ALL NEW WORK OR BETTERMENT	TO BE AUTHORIED	
Gen'l Mgr. Dep't. No		Utah,190
1. Location 2. Title		
3. General description		
		·
4. New work or betterments		
`		
6. Estimate of Cost: Labor, \$ 7. Work should be commenced	Material,	\$ Total, \$
Length of time required to comp To be charged to	plete work	
	.	Approved
	Gen'l Supe	rintendent. Gen'l Manager.
Date Commenced190		190
ESTIMATED Labor, \$		
Increase, \$Per Cent	Decrease,	Per Cent
APPLICATIONS TO BE TRANSMITTED A 1st—Original and Duplicate to Gene 2d—Original to General Superinten 3d—Original to Auditor when wo Superintendent through General Man	eral Manager for app dent and Duplicate t k is completed to b	roval. to Auditor. se checked and returned to General

Improvements.—All expenditures for Additions to Plant and Improvements require a special appropriation if the amount involved exceeds \$100.00. An estimate of the work contemplated is made out on form 3 (Fig. 149), in duplicate by the mine Supt., and forwarded to the General Manager, through the General Supt. for approval.

The General Manager makes out an "Appropriation for Improvements," form 4 (Fig. 150), in triplicate and forwards it to the Vice President for approval; after being approved the work may be started. The disposition of the form is explained on the form itself. Copies of all

APPROPRIATION FO	Appropriation No OR IMPROVEMENTS
•	AUTHORISED ON THIS BLANK BEFORE WORK
To the Second Vice President, Denver, Colorado. I would respectively recommend an appropriative atlached, and request your approval of the same: Gen'l Sup't Dep't No	on for improvements described below, with details
3. General description	
4. New work or betterments 5. Necessity for sams 6. Estimate of Cost: Labor, \$	
8. Length of time required to complete work 9. To be charged to	
Second Vice President	General Manager
Date Commenced	Date Completed
Increase, \$Per Cent	Decrease, \$Per Cent 78: 900nd Vice President for approval.

Fig. 150.—Form 4.

	U PLEA	P. TAH FUEL INCLUD ASANT VALLEY ditures for Additi	ING COAL COMP	ANY	
DETAILS	Req. No.	From Vouchers	Pay-rolls	Material	Totals
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Fig. 151.—Form 5.

UTAH	FUEL CO	MPANY	
	INCLUDING	•	
LEASANT	VALLEY COA	L COMPANY	
xpenditures	for Additions t	o Plant, Improvemen	ts, Etc.,
	190	at	Mines,
ended to da	ite and amount	to be expended to co	mplete same.
Req. No.	Estimated Cost	Amount Expendedto19	Balance to be Expended to Complete
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	LEASANT xpenditures ended to de	INCLUDING LEASANT VALLEY COA spenditures for Additions t	LEASANT VALLEY COAL COMPANY spenditures for Additions to Plant, Improvement at a sended to date and amount to be expended to co Reg. No. Estimated Cost Amount Expended

Fig. 152.—Form 6.

"Appropriations" go to the Auditor, who opens separate accounts with each one in the auxiliary records.

At the end of each month a statement form 5 (Fig. 151), is made up for each mine, listing the various appropriations for Improvements, Additions to Plant, etc., and showing against each one the expenditures for the month. These expenditures are sub-divided as follows: Vouchers, Pay-rolls, Material and Total.

Another statement is made up each month for each mine, listing each appropriation made during the fiscal year, the nature of the work authorized, the estimated cost, amount expended to date, and the balance of the appropriation available to complete the work. See form 6 (Fig. 152).

Transfer of Equipment, Supplies, Etc.—As it frequently happens that it is advisable to transfer material from one mine to another, a proper record of the transfer is necessary, and to facilitate matters a "Transfer Letter" (form 7, Fig. 153) is made out in triplicate by the mine supt. shipping the material in question, giving the details of the material transferred. The original copy is forwarded to the Auditor, and the duplicate and triplicate to the consignee. Upon receipt of

Form 506-11-1-10-1 m-R. P. TRANSFER LETTER 191
Mr191
Mine Superintendent
Dear Sir:
The following items have been reported to Auditor, as a charge to your mine, month of
Charge
I have also charged your mine direct from our pay-rolls, as follows:
Checked and Accepted Yours truly,
Mine Superintendent Mine Superintendent
Note: Instructions from Auditor. Charges to your various M. & S. Acet's should be charged out on your monthly M. & S. Report just as soon as material is used, giving reference to source of charge. Direct charges from other mine pay-rolls to your M. & S. Acet, you will take up and charge out as used, but charges to Underground Inspection, B. & B. H. Expenses, or any other account but M. & S. Acet., is taken up by the Auditor and charged to the proper account.

Fig. 153.—Form 7.

material the receiving Supt. will O. K. the duplicate copy and forward to the Auditor.

Depreciation.—The Coal Lands of the company are depreciated or written off on a basis of acreage worked out each year. That is to say that the total cost of the coal lands of each mine represents an average value per acre, and as the depreciation is not considered until the mine is on a permanent producing basis, it is only necessary to estimate the number of acres that will be exhausted at the end of the year to arrive at the proper amount to write off during the year. This amount is prorated one-twelfth each month to Depreciation of General Plant A/c. Any inaccuracies that may be made in estimating the amount that is written off during the year is adjusted during the following year.

Depreciation of Plant Buildings, etc., is charged and credited as above, in addition to charge for acreage worked out.

Depreciation of Plant Account is estimated on a basis of the life of the mine and is dependable on the production. At the time the mine is placed on a permanent producing basis the plant account will represent an average amount per acre, as depreciation is figured from the estimated acreage to be worked out during the year, the amount to be written off during the year is arrived at by multiplying the average plant expenditures per acre by the estimated acreage to be exhausted during the year. This amount is pro-rated one-twelfth each month to Sinking Fund Installment and credited to Depreciation Account. As the Plant Account varies from year to year, by the expenditure of additional capital for additions, improvements, etc., it is necessary to adjust this account each year.

Details of General Expenses.—In order that an accurate detailed record may be kept of all expenditures and segregated so as to show each account, sub-account also each appropriation, this detail of General Expenses is kept. The expenditures are posted each month to these accounts from the Pay-rolls, Vouchers, Report of Material and Supplies.

REPORTS, ETC., RECEIVED FROM THE MINES

Pay-rolls
Pay-roll Deductions
Pay-roll Distribution
Boarding House Report
Rent Statement
Animals Killed and Sold
Pay-roll Deficiency List
Unclaimed Wages List
Supplies Used Report
Daily Report Mine Operations
Daily Report Coke Oven Operations
Average Report of Operations

Weighmaster's Report
Daily Shipping Report
Report of Coal Mined—Distribution
Report of Hay and Grain
Nationalty Report
Statement of Local Coal sales.

Pay-rolls.—All Pay-rolls are received from the mines as soon after the end of the month as they are completed. These Pay-rolls are entered in the Abstract of Vouchers and charged to accounts receiving benefit as shown by Distribution of Pay-rolls, and credited to Pay-rolls. When paid the amount is credited to the Treasurer and charged to Pay-roll account.

Pay-roll Deductions.—These reports are entered in the Abstract of Vouchers the total amount of deductions that go as credit to company ledger accounts are charged to Pay-roll account and the other deductions are charged to their proper accounts.

Boarding-house Reports.—These reports are checked up with the debit and credit charges on the books and the free board furnished is charged to mine expense account and credited to Boarding-house Receipts.

Animals Killed and Sold.—The debits and credits as shown by these reports are journalized, the value of Animals killed or sold being credited to the Animals Killed and Sold account and charged to Hauling. The cost of Animals purchased would be charged to that account thus making the same entries as appear on the mine books.

Unclaimed Wages.—These reports list the individuals and amount due them in wages that remain unclaimed on pay day and are returned to the General Office with the amount in cash. These wages are placed to the credit of the Unclaimed Wages account by journal entry and charged to the Treasurer.

Supplies Used Report.—These reports are passed through the abstract of Vouchers and charged to the various mine accounts, the total being credited to Material and Supply account.

Daily Shipping Report.—These reports cover the shipment of all Coal and Coke and are received daily. They are recapitulated, showing the tonnage of Coal and Coke, also the accrued earnings for the same. Journal entries are made from these reports charging consignees and crediting earnings with the amounts shown.

REPORTS MADE AT THE GENERAL OFFICE

Supplies.—A statement of the Material and Supply account is made up each month (form 8, Fig. 154) by the Auditor. This statement shows the balance of the account at the first of the month and all debits to the account. The credits are itemized showing the totals as charged to the

different accounts. All journal entries effecting the Material and Supply account are also shown.

Recapitulation of Shipments.—This record is made up on form 9 (Fig. 155) from the Daily Reports of Shipments received from each mine each day. The shipments are shown according to grade, the weight and estimated earnings being also shown.

atement of Material a	ind 8	ирр	lies	A	cco	ınt			Min	B No.		_ 1	or Month of	_	19	1
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Total Charges from Vouchers					1	П	T	Т	Mining	Т	П		Coal Sales at Mine	П	П	ſ
Labor from Pay Rolls					Т	П	T	Т	Hauling	T			B. & B. H. Expenses	П	П	ľ
Coal to Bollers, Etc.					T	П	T	Т	Loading	Т	П		B, & B. H. Fixtures	П	П	ľ
Transferred from	Vouchers Mining Coal Sales at Mine Alia Hauling R. & B. H. Expenses A. Loading R. & B. H. Expenses Bepairs to Cars Ind'ts and Co.'s Bepairs to Tracks Bills Collectible Electric Light Medical Dep't. Entering Rooms Ventilation Watering Timber and Props Dead Work Rop. Edgs, and Chutes Cars and Treeties															
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					Т	11	T	Τ	Electric Light	1	П		Medical Dep't.	П	П	ſ
						П	T	I	Entries	T	П			П	П	ſ
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						П		Γ	Rep. Bidgs. and Chute	$\cdot \mathbf{L}$	П				П	ſ
Material and Supplies Acco	unt Ent	ziet				П		L	Repairs Machinery		Π				П	ĺ
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Fig. 154.—Form 8.

Tonnage and Earnings.—A weekly statement is made out by the Auditor showing the estimated tonnage and earnings, this year, last year and the increase or decrease. (Form 10, Fig. 156.)

Cost Sheet Coke Ovens.—A detailed report of operations at the Coke Ovens is made up each month, showing the expenditures against each account and sub-account. These charges are divided, showing labor and material separate. The information for this Cost Sheet is taken from the Pay-roll distribution, Report of Material and Supplies Used and the Production record. (See form 118, Fig. 157.)

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Ig. 155.—Form 9.

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Western Pac. Ry.		П	1	Ä	E S	1	$\ \ $	-		1	l	_		l				6			ĺ	l_		钋	F
San Pedro L. A. & S. L. R. R. Ca.		Н	1	¥	1	1		-				TONS		1			1		1		1	8	į	4	Ͱ
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TOTAL		Н		OPERATIONS FOR THE WEEK	H	П	П						l	1				Av. Temper		1	1		į	ᇵ	H
Coal to Coke Ovens C. G,		Н	l	ဥ		П	П	7	$\top$	Т	Н	2	Г	T	П	Г	1		t	t	T	6	3	4	L
" Bollers etc. W. Q.		Н		9	Clear Creek	۱	Ш				П	OUTPUT	l					Mo, of Ones	1	1		≿	j	좌	H
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UNCONSIGNED Increase ever last month		Ц			$\vdash$	Н	⊬	+	+	IJ	H		$\vdash$	-	Н	Н		⊢	$\vdash$	╀	H				آ
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COKE TOTAL COAL	-	Ц			Œ	П		1		TOTAL COAL	Dally Average			<b>.</b> 7			Į.	l.						L	L
COKE Utah Smolters		Н			COAL SHIPMENTS	П				Ę	A				Dally Always on bagin	No. of Days Worked	COKE SHIPMENTS		ĺ					F	H
" Other Industries		Н			Į	П				П	П				ă	*	F		١.					H	H
Idaho		П			ğ	П			Ž	П	H		TOTAL		4	Ā	ğ		8	side.	Total			L	Г
Nortana Norada		Н			ľ	ĝ	Engine	Į į	Run of Mine Slack	H	١		۲	þ	취	8	່		Castle Gate	bunnyside	취	l		H	Н
		ロ		-	<u>L</u>	13	ě.	Z	# Z	Ц	Ц	_	Ш	e,	٩	×	Ц,	닏	ō	-	Ш	L	_	_	口
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TOTAL COAL AND COKE								_			L		_	_ }			_	乚	_		_	<u> </u>			4
						_															Ān	dit			

Fig. 156.—Form 10.

OF	LABOR MATERIAL	T				1 Bornita						RECAPITULATION	SHOWING COST PER TON	_	4	OENTO OENTO	Sarke																DES) THIS YEAR   LAST YEAR				Ossi				Anditor.	
MPANY COKE OVENS, MONTH OF	MATERIAL	3	Pay Day Expenses	Watchman	Jenitor Berries	Talendone Berein		-				HEG HEG	SHOW	- THIRDS	e i uococu	1	Superintendents and Clerks	Engineering	Charging Overs	Burning and Drawing	Londing Colle	Firing Cold Overse	Repairs to Coke Overs	Repairs to Buildings	Loke & perments								COKE (ALL GRADES)		Tous Coke Made	Tree Oral Used	Percentage of Coke to Ceal	No. Orene Drawn		Correct:		Ī
PLEASANT VALLEY COAL COMPANY SES AT COKE (	Neon	П			1								1								1																					
PLEASANI VALLET (PENSES AT		45 LOADING COKE	Loading R.R Cars by Centract	Loading B.R. Oars by Day Labor	Car Reporter	Demand to R. Cars and Tracks	Expense and Repair Tools	R. R. Welchman	Cost Dummy Doors	Repairs R. M. Track Scales			46 LOADING CINDERS	Londing and Uniceding R. B. Care	Bauling Away in Wagens	Cleaning Decks	Propertion Stable Expense	Depreshities of Animals			Wand Hard	Coal Used	Charging, Burning and Drawing	Disposing of Cinders		48 REPAIRS TO COKE OVENS	Brick and Pire Clay	One Iron Door Premen	Reporting Overs	Repairs Dock Walls	49 REPAIRS TO BUILDINGS	Stack Bing	Store and Tool House	Treetles and Bridges	Buperlatendent's Office			SO CORE EXPERIMENTS	Preparing and Coking Coal	Ones of Analysis	Laboratory Equipment	
OPERATING E	LABOR MATERIAL				1																																					
DETAILED REPORT OF OPERATING EXPENSES AT			Tons @			BARRIO A BLANCK PARKET	Prop Gen & Cote Buchelal's & Kruns	Onke Oven Poremon	Propertion Office Clerks	Proportion Office thapplies	Timekeeper				48 ENGINERING	Mine Surveyors and Assistants	Outside Expenses				AS CHARGING OVERS	Proportion Power House Expense	Reseding Cont of Stag	Gleaning at Bins and Scales	Weighing Charges	Repairing Larry Cars and Tracks	Repairing Motor and Power Lines	Levelors.			M BURNING AND DRAWING	Coke Pullers	Plastering Oven Doors	Proposition Parameter Remains	Repairs Oven Weter Line	Repairs Tools	Charging Hole Covers					

FIG. 157.—FORM 118.

# UTAH FUEL PLEASANT VALLEY DETAILED REPORT OF OPERATING EXPENSES AT

COAL EXPENSES	LABOR	MATERIAL	COAL EXPENSES	LABOR	MATER
EXPENSE OF MINING			9 VENTILATION		
Hand Mining			Proportion Power House Expense		
Contract Machine Mining			Gas and Air Inspectors		ļ
Day Work Machine Mining		!	Fan Expenses and Engineer		
Drilling, Shooting and Leading			Building and Repairing Stoppings		1
Loading Company Coal			Brattice Cloth and Brattleing		
Proportion Power House Expense		ľ	Building and Repairing Mine Doors		
Ladders and Tool Boxes			Trappers		
Running Man Trip		1	Cleaning Air Ways	<b></b>	<b>!</b>
Sharpening Tools Powder Man		<u> </u>	Repairing Air Ways		₩
					<b> </b>
Cherk Man Wire Man		₩		!	1
Shot Inspectors		<del> </del>		-	
Wood Pulp		<del> </del>			-
Earth Tamping		<del> </del>	10 DRAINAGE AND WATER'S MINE		<del>!</del>
Tamping and Powder Boxes		-			+
Interpreter	<del></del>		Proportion Power House Expense		
Inter praces		<del> </del>	Outside Pumps and Pumpmen	<del> </del>	₩
		<del>                                     </del>	Inside Pumps and Pumpmen		<b>†</b>
		ļ —	Water Men and Supplies	·	<del>!</del>
BAULING	i — —	1	<del> </del>	1	1
Proportion Power House Expense	-	#	<b> </b>	!	
Drivers	<del>                                     </del>	#	#		# -
Outside Holstmen	<del> </del>	<del> </del>	<b>  </b>	<del></del>	<del> </del>
Underground Holstmen		+	<del> </del>		<b> </b>
Locomotive Men	1	1	IL TIMBER AND PROPS		1
Rope Runners		+	Driving Entries and Rooms		₩
Couplers and Spraggers	<del> </del>	#	Retimbering and Robbing Rooms		<del>                                       </del>
Roller Men and Greasers	+	<del> </del>	Repairing Haulage Entries		#
Proportion Stable Expense	<b> </b>	<del> </del>	Repairing Air and Traveling Ways		#
Harness Repairs and Shoeing	<del> </del>	<del> </del>	Unloading and Piling	<del> </del>	<del>                                     </del>
Clearing up Wrecks	<u> </u>	#	Hauling and Sawing	<del> </del>	+
Repairs Haulage Signals	<del>!</del>	#	Loading and Delivering	<b> </b>	<del>                                       </del>
Cleaning Haulage Tracks	1	+	Drawing Prope	1	1
Roller Repairs and Renewals	<del> </del>	·	1	1	<b>†</b>
Repairing Haulage Entries		1			
Depreciation of Animals	1			I	
		if			
		1			
		H	13 DEAD WORK	1	1
		J	Retimbering Rooms		
	Ī		Regrading and Brushing Entries		1
LOADING	l	1	Prospecting Faults		I
Outside Fereman's Salary	ļ.	i	Leading and Hauling Rock	I	i
Weighmen and Topmen	1	1	Dumping and Stowing Rock	i	1
Pushers and Dumpers	1	1	Underground Inspection		
Couplers and Spraggers		1	Repairing and Replacing Co. Tools		
Proportion Power House Expense	B.			i	1
Running Chute Engine			<u> </u>	1	4
Leading by Day Labor	1	1	4		#
Loading by Contract	<b>!</b>	1	<b>4</b>		#
Rann's & Bep'nz Bux Car Loader	4	11		<b>↓</b>	<b>√</b>
Car Handlers	#	<b>.</b>	<b>!</b>	<b> </b>	-
Attendance Elevators, Screens, etc.	<b> </b>	¥	15 REPAIRS TO BLDGS. & CHUTES	<b></b>	#
Cost Dummy Doors	<del> </del>	<del></del>	Main Chute and Trestle	<del> </del>	#
Unloading Dust and Yard Waste	<del> </del>	+	Crusher, Elevator & Screen Suild'g	<del>!</del>	+
Cleaning Yard Tracks	#	+	Power and Botter Houses	<b>#</b>	#
Damage to R. R. Cars and Tracks	<del> </del>	+	Engine House	#	#
	ļ	<del></del>	Barn and Corral Buildings	₩	+
	<del> </del>	+	Doording Houses	<del> </del>	+ -
	<del> </del>	1 -	Blacksmith and Machine Shops	<del> </del>	#
	<del>  </del>		Other Mine Buildings	+	+
		-	R. R. Track and Mine Scales	<del> </del>	#
4 BEPAIRS TO CARS	ļi .		<b> </b>	₩	+-
Repairing Wrecked Cars	<del> </del>	#	<b> </b>	+	+
Repairing Worn Out Cars	<b>#</b>	#	<b></b>	-	#-
Replacing Lost Care	#	4	<del> </del>	1	+
Replacing Wheels and Axles	1	ll .	I	ll .	1
	<del> </del>	+	#	1	
		11	M		

Fig. 158.—Form 110.

#### COMPANY COAL COMPANY

......MINE. MONTH OF.....

. COAL EXPENSES	LABOR	MATERIAL	COKE EXPERSE	•	LABOR	MATERIA
A ENGINEERING			45 REPAIRS TO COME OVE	ints.		
Mine Surveyors and Assistants			Brick and Fire Clay			
Office Supplies			Stone, Lime, etc.			ļ
Outside Expenses			Cast Iron Door Frames			
			Repacking Ovens Repairs Dock Walls			
			Repairs Dock waits		$\overline{}$	
T GENERAL EXPENSES						
Proportion Stationery and Printing			40 REPAIRS TO BUILDING	9		
Janitor Service			Slack Bins			
Sundry Supplies			Store and Tool House			
Office Fixtures			Scale House			
Firing Office Heater			Treatles and Bridges			
			Superintendent's Office			
	l					
			SO COKE EXPERIMENTS			
			Preparing and Coking C	oel		
IS INCIDENTALS			Transportation on Sample			
Miscellaneous Teaming			Cost of Analysis			
Pay Day Expenses			ļ			
Express on Money			L			
Free Coal			SI INCIDENTALS			<b>-</b>
Watchman			Pay Day Expenses			ļ
Guard & Special Service Expenses			Watchman Janitor Service			
		<del> </del>	Free Coal	<del>-</del>		
			Telephone Service and R	enelra		<del> </del>
	-		Telephone Belvice and it			<del> </del>
			1			
			i			
			2501			
COME EXPENSES	LABOR	MATERIAL	81	PITULAT		
40 COAL USED	LABOR	MATERIAL	RECA SHOWING COST P			OOKE
	LABOR	MATERIAL	SHOWING COST P	ER TON O		OOKE
COAL USED	LABOR	MATERIAL	SHOWING COST P		OAL AND	
COAL USED	LABOR	MATERIAL	SHOWING COST P	ER TON O	OAL AND	
◆ COAL USED Tons ◆	LASOR	MATERIAL	SHOWING COST P	ER TON O		PER YON
Tons •	LASOR	MATERIAL	SHOWING COST P	ER TON O	OOST This Year	PER YON
COAL USED  Tons ©  **I RUPERINTENDENTS & GLERKS  Proy's Gen. & Mine Supt's Sal's & Esp'ns  Coke Oven Foremen	LASON	MATERIAL	SHOWING COST P CO. ACCOUNTS  Expense of Mining Hauling	ER TON O	OOST This Year	PER YON
TORS @  11. RUPERINTENDENTS & CLERKS Prog's Ocs. & Mine Supi's Sal's & Exp'ss Coke Over Forsman Propertion Office Cierks	LABOR	MATERIAL	SHOWING COST P  OO.  ACCOUNTS  Expense of Mining  Hauling  Loading	ER TON O	OOST This Year	PER YON
Tons   RUPERINTENDENTS A CLERKS Proys Gen. & Mine Supt's Sal's & Esp'ns Coke Oven Forsmen Proportion Office Cierks Proportion Office Supplies	LABOR	MATERIAL	ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care	ER TON O	OOST This Year	PER YON
TORS ©  SI RUPERINTENDENTS & CLERKS Proy's Ocs. & Mine Supi's Sal's & Exp'ns Coke Over Porsmen Proportion Office Cierks	LABOR	MATERIAL	SHOWING COST P CO. ACCOUNTS Expense of Mining Hauling Londing Repairs to Care Repairs to Tracks	ER TON O	OOST This Year	PER YON
Tons   RUPERINTENDENTS A CLERKS Proys Gen. & Mine Supt's Sal's & Esp'ns Coke Oven Forsmen Proportion Office Cierks Proportion Office Supplies	LABOR	MATERIAL	SHOWING COST P  ACCOUNTS  Expense of Mining Hauling Loading Repairs to Cars Repairs to Tracks Electric Light	ER TON O	OOST This Year	PER YON
Tons   RUPERINTENDENTS A CLERKS Proys Gen. & Mine Supt's Sal's & Esp'ns Coke Oven Forsmen Proportion Office Cierks Proportion Office Supplies	LABOR	MATERIAL	ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Tracks Electric Light Entry Driving	ER TON O	OOST This Year	PER YON
TORS ©  TORS ©  TORS ©  AUPERINTENDENTS & CLERKS  Proya Gen. & Mine Supi's Sal's & Exp'ns  Coke Oven Foramen  Proportion Office Cierks  Proportion Office Supplies  Timekeeper	LABOR	MATERIAL	ACCOUNTS  Expense of Mining Hauling Loading Repairs to Cars Repairs to Tracks Electric Light Earty Driving Ffooms and Rolls	ER TON O	OOST This Year	PER YON
TORS ©  ALPERINTENDENTS & CLERKS Proy's Ocs. & Miss Sopt's Sal's & Kayns Coke Oven Foremen Proportion Office Cierks Proportion Office Supplies Timekeeper	LASOR	MATERIAL	ACCOUNTS  ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Care Electric Light Eatry Driving Flooms and Relis Ventilation	ER TON O	OOST This Year	PER YON
COAL USED  Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons    **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons    **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   **Tons   *	LABOR	MATERIAL	ACCOUNTS  Expense of Mining Hauling Londing Repairs to Care Repairs to Tracks Electric Light Entry Driving Koome and Rolls Ventilation Drainage & Watering Mine	ER TON O	OOST This Year	PER YON
TORS ©  ALPERINTENDENTS & CLERKS Proy's Ocs. & Miss Sopt's Sal's & Kayns Coke Oven Foremen Proportion Office Cierks Proportion Office Supplies Timekeeper	LABOR	MATERIAL	ACCOUNTS  ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Care Electric Light Eatry Driving Flooms and Relis Ventilation	ER TON O	OOST This Year	PER YON
TORS ©  SI SUPPRINTENDENTS & CLERKS Proy's Ocs. & Mine Sopt's Sal's & Kay'ns Coke Oven Forsmen Proportion Office Clerks Proportion Office Supplies Timekeeper  SE ENGINEERING Mine Surveyors and Assistants Office Supplies	LABOR	MATERIAL	ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Tracks Electric Light Entry Driving Hooms and Relis Ventilation Drainage & Watering Mine Timber and Propa Dead Work	ER TON OCAL EXPENSES	OOST This Year	PER YON
Tons @  Tons @  I SUPERINTENDENTS & CLERKS Proy's Ocs. & Mine Supt's Sal's & Kay'ss Coke Oven Forsmen Proportion Office Clerks Proportion Office Supplies Timekeeper  REGINERATING Mine Surveyors and Assistants Office Supplies Office Supplies	LABOR	MATERIAL	ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Tracks Electric Light Eatry Driving Rooms and Rolls Ventilation Drainage & Watering Mine Timber and Props	ER TON OCAL EXPENSES	OOST This Year	PER YON
TORS ©  SI SUPPRINTENDENTS & CLERKS Proy's Ocs. & Mine Sopt's Sal's & Kay'ns Coke Oven Forsmen Proportion Office Clerks Proportion Office Supplies Timekeeper  SE ENGINEERING Mine Surveyors and Assistants Office Supplies	LABOR	MATERIAL	SHOWING COST P  CO.  ACCOUNTS  Expense of Mining Hauling Loading Repairs to Cars Repairs to Tracks Electric Light Eatry Divining Flooms and Relis Ventilation Drainage & Watering Mine Timber and Props Dead Work Repairs to Bidgs, and Chutes Repairs Machinery	ER TON OCAL EXPENSES	OOST This Year	PER YON
TORS ©  AUPERINTENDENTS & CLERKS Proya Gen. & Mine Supi's Sal's & Exp'ns Coke Oven Foremen Proportion Office Clerks Proportion Office Supplies Timekeeper  ENGINEERING Mine Surveyors and Assistants Office Supplies Outside Expenses	LABOR	MATERIAL	SHOWING COST P  CO.  ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Tracks Electric Light Eatry Driving Rooms and Relis Ventilation Drainage & Watering Mine Timber and Propa Dead Work Repairs to Bligs and Chutes Repairs to Bligs and Chutes Repairs Machinery	ER TON OCAL EXPENSES	OOST This Year	PER YON
TORS ©  TORS ©  14 SUPERINTENDENTS A CLERKS Proy's Ocs. & Mice Sopt's Sal's & Espise Coke Oven Foremen Proportion Office Cierks Proportion Office Supplies Timekeeper  48 ENGINEERING Mine Surveyors and Assistants Office Supplies Outside Expenses	LABOR	MATERIAL	SHOWING COST P  ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Cracks Electric Light Entry Driving Kooms and Relis Ventilation Drainage & Watering Mine Timber and Props Dead Work Repairs to Bidgs. and Chutes Repairs Machinery  Engineering General Expense	ER TON OCAL EXPENSES	OOST This Year	PER YON
Tons ©  Tons ©  AUPERINTENDENTS A CLERKS Proys Oca A Mine Sopt's Sal's & Exp'ns Coke Oven Foremen Proportion Office Cierks Proportion Office Supplies Timekeeper  REGINEERING Mine Surveyors and Assistants Office Supplies Outside Expenses  CHARGING OVENS Proportion Power House Expense	LABOR	MATERIAL	SHOWING COST P  CO.  ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Tracks Electric Light Eatry Driving Rooms and Relis Ventilation Drainage & Watering Mine Timber and Propa Dead Work Repairs to Bligs and Chutes Repairs to Bligs and Chutes Repairs Machinery	ER TON OCAL EXPENSES	OOST This Year	PER YON
TORS ©  AUPERINTENDENTS & CLERKS Proy's Gen. & Mine Sup's Sal's & Esp'ns Coke Oven Forsmen Proportion Office Clerks Proportion Office Supplies Timekeeper  SERGINEERING Mine Surveyors and Assistants Office Supplies Outside Expenses  GENERATING COMMANDERING MINESURVEYORS MINESURVEYORS MINESURVEYORS MINESURVEYORS MINESURVEYORS MINESURVEYORS MINESURVEYORS MINESURVEYORS MINESURVEYORS  FORDERING OVENS Proportion Power House Expense Handling Coal at Bins	LABOR	MATERIAL	SHOWING COST P  ACCOUNTS  Expense of Mining Hauling Loading Repairs to Care Repairs to Cracks Electric Light Entry Driving Kooms and Relis Ventilation Drainage & Watering Mine Timber and Props Dead Work Repairs to Bidgs. and Chutes Repairs Machinery  Engineering General Expense	ER TON OCAL EXPENSES	OOST This Year	PER YON
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Fig. 158.—Continued.

(Fig. 158.—Concluded.)

		Bellets and Consections	
		Steam Lines	
8 REPAIRS TO TRACKS		Stationary Steam Engines	
Hoist and Locomotive Tracks		Steam Hoisting Engines	1
Ordinary Entry and Room Tracks		Ricctric Hoisting Engines	
Taking up Old Rails and Ties		Air Compressors	
New Ties Used		Electric Generators	
Track Spikes, Bolts and Fish Plates		Electric Locomotives	
New Halls Used		Miscellaneous Electric Motors	
		Outside Pumps	
		Underground rumps	
1		Outside Water Lines	
		Underground Water Lines	
6 MLEGTRIC LIGHT		Outside Air Lines	
Proportion Power House Expense		Underground Air Lines	
Repairs Interior Wiring		Outside Electric Power Lines	
Replacing Lamps Outside	<del></del>	Underground Electric Power Lines	<del></del>
Replacing Lamps in Mines		Fane and Fan Engines	
	<del></del>	Proportion Crushers, Elevators, etc.	
		Tipples and Screens	
		Renewal Wire Ropes	<del></del>
		Mining Machines	
T SPITKY DRIVING		Machinery Inspection	<del></del>
Yardage in Straight Coal	<del></del>	Telephone Lines	<del>-   </del> -
Yardage in Coal and Rock	<del></del>	Wagons	
Yardage in Straight Rock	<del></del>	- H - W - S - O - O - O - O - O - O - O - O - O	
Allowance for Boney Coal or Rock		<del></del>	<del></del>
Allowance for Rolls		<del></del>	
Allewance for Water	<del></del>		
		<del>-   </del>	
			<del></del>
		T	
8 ROOMS AND BOLLS		15 SUPERINTENDENTS & CLERKS	
Rooms Turned			<del></del>
Allewance for Rolls in Rooms		Prop'n Gen. & Mine Sapt's Sal's & Exp'ns Mine Foreman	<del></del>
Allowance for Brushing Roof	<del></del>	Mine Clerks	<del></del>
Allowance for Boney Coal or Rock		and Cieras	
Allowance for Water		<del></del>	
Allowance for water		- <del>  </del>	
<del></del>		<del>                                     </del>	
		-  <del></del>	

Cost Sheet Mine.—A detailed report of operations for each mine is made up each month showing the cost of operations for each account and sub-account both Coal expense and Coke expense. These charges are divided, labor and supplies being shown separately. The information for these cost sheets is taken from the Pay-roll Distribution, Report of Material and Supplies Used, and the Production Record. See form 12, Fig. 158.

Monthly Report of Operations.—This report (form 13, Fig. 159) is made out in triplicate at the end of each month, the duplicate copy going to the General Manager. The report covers statistics of Force Employed, Expenses, Cost per ton, Output, etc., for all mines of the company.

Comparative Statement of Operations.—This statement (form 14, Fig. 160) is made up each month covering all mines and coke plants as to Production, Earnings, Expenses, etc., for each mine and coke plant. A distribution of product, both coal and coke is also shown and the earnings on the same. The information for this statement is taken from the general ledger accounts and the production record.

Financial Statement.—At the end of each month, after the general books have been closed this statement is made out in the following form:

# (Fig. 158.—Concluded.)

Tre	oportion Pumping Expense	1 1	71	Average Mines per Day		ſ	
Re	pairs Oven Water Line			Average No. Miners Working			
Re	pairs Tools			Average Tons per Man Daily			
Ch	arging Hole Covers						
$\overline{}$							
				00	KE EXPENSES		
_		1		ACCOUNTS	TOTAL EXPENSES	008T P	
$\vdash$				ACCOUNTS	TOTAL EXPENSES	This Year	Last Year
<del></del>				Coal Used			
45 10	ADING COKE			Superintendents and Clerks		•	l
	ading R. R. Care by Contract			Engineering		•	l
	ading R. R. Cars by Day Labor	1		Charging Ovens	•	l	l
_	r Handlers	1		Burning and Drawing		1	Ī
	eaning R. R. Tracks	-		Loading Coke	1		1
	mage to R. R. Cars and Tracks	<del> </del>		Loading Cinders			
	pense and Repair Tools	<del> </del>		Firing Cold Ovens			
	R. Weighman			Repairs to Coke Ovens			
	st Dummy Doors	<del> </del>		Repairs to Buildings			
	pairs R. R. Track Scales	<del>                                     </del>		Coke Experiments		1	
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	<del> </del>		Incidentals			
<b></b>		<del> </del>		ZHEIGHNAID.			<del>                                     </del>
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l	ADING CINDERS						<del> </del>
	eding and Unloading R. R. Cars	<del>    </del>					-
	auling Away in Wagons	<del> </del>			<del> </del>		
	eaning Docks	<del> </del>					
	pense and Repair Tools	<del>}                                    </del>			<del> </del>		
	oportion Stable Expense	<del> </del>			<del> </del>	<b></b>	
<del></del>	Operation Statute Expense	<del>  </del>			<del> </del>		
<del></del>		<del>                                     </del>					1
$\vdash$		<del> </del>					
$\vdash$				OOKE (MT GUNDES)	THIS YEAR	LAST	YEAR
47 F1	RING COLD OVENS	1		Tons Coke Made	li	ii .	
W	eod Used			Tons Coal Used		1	
Co	al Used			Percentage of Coke to Coal			
Ch	sarging, Burning and Drawing			No. Ovens Drawn		1	
DI	sposing of Cinders				T	11	
				Correct:			
_		N H		1			
$\vdash$						4	tuditor.
F				Salt Lake City, Utah,		*	tuditor.

## UTAH FUEL COMPANY

Exhibit	19
INCOME ACCOU	'NT _.
For month of	
Gross earnings from sale of Coal and Co.	ke \$
Operating Expenses	•••••
Total net earnings from mines	
Add receipts from miners houses, etc.	*******
Interest, discount and exchange	
TOTAL INCOME.	
Deduct fixed charges, etc.	*******
Taxes Nevada	• • • • • • •
Insurance	••••••
Personal Injury Claims	* * * * * * * * *
Coal Prospecting	
Depreciation of Gen. Plant account	••••••
NET INCOME	

ACCOUNTY   TOTAL GALER BINE   CALLER CREEK BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UTAN BINE   UT	TOTAL
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Fig. 159.—Form 13.

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G. 160.—FORM 14.

# GENERAL PROFIT AND LOSS ACCOUNT

By income as above		
To		• • • • • • • •
Balance		
Balance to credit of Profit and Loss account		• • • • • • • •
month of		
INCOME ACCOUNT		
Fiscal year to date		
From June 1to		
Gross Earnings from sale of Coal and Coke		
Operating Expenses		• • • • • • • • • • • • • • • • • • • •
Total net earnings from mines		• • • • • • • • • • • • • • • • • • • •
Add receipts from miners houses		• • • • • • • • • • • • • • • • • • • •
Interest Discount and Exchange	• • • • • • • • • •	
Total Income	•••••	• • • • • • • • • •
Deduct fixed charges		• • • • • • • • •
Taxes Nevada		
Insurance		
Personal Injury Claims		
Coal Prospecting		
Depreciation of General Plant account		
NET INCOME	•	
,		
GENERAL PROFIT AND LOSS A	ACCOUNT.	
Balance to credit of Profit and Loss account		
Income as abovemonths	• • • • • • • • • •	
Balance		
D. 1. 11. 12. 13. 14. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • •
Balance at the credit of Profit and Loss account		
		• • • • • • • • •
BALANCE SHEET		
Current Assets.		
Material and Supplies		
Engineering Property		
Cash in Treasury		
Due from Indvs. and Comps. Coal sales		
Due from Indvs. and Comps. Bills Collectible		
Bills Receivable		
Fire Insurance (not charged out)		
Pay-roll overdrafts		• • • • • • • • •
Current Liabilities.		
Vouchers		
Pay-rolls	• • • • • • • • •	
Unclaimed Wages	• • • • • • • • •	
R. R. Co., for freight	•••••	
ontons Coal	• • • • • • • • • • • • • • • • • • • •	
Taxes Nevada payable	• • • • • • • • • •	• • • • • • • • •

General	Accounts.			
	Cost of Property			
	Additional Expenditures			
	Lands, Swan Creek			
	Machinery for General Prosp	ecting		
	Saloon buildings			
	Boarding house fixtures			
	Less Depreciation			
	Capital Stock			
Defermed	l Accounts,			
Deterred	Personal Injury Fund			
	Animals Killed and Sold			
			• • • • • • • • • • •	
	Special Renewal Fund		• • • • • • • • • •	
	Profit and Loss			
			<b>\$</b>	S
	DETAILS OF ADDI	ITIONAL EXPI	ENDITURES	
		9to		.19
Account	8,		•	
	Lands			
	Tramways Chutes and Trestl	es		
	Cars and Tracks			
	Power and Machinery			
	Buildings			
	· ·			
	Mine Developments			

### MINE OFFICE ACCOUNTING

Timekeeping.—Both outside and inside foremen are supplied with pocket Time Books (form 15, Fig. 161). These books are designed for one month's use, each employee being assigned a page each month

	101
	191
DATE	OCCUPATION
1	
2	
3	
4	
5	
27	
28	
29	
30	
31	

Fig. 161.—Form 15.

As stated above each foreman keeps the time of his men in these books and also shows the distribution of labor for each individual.

Each employee upon entering the service of the company is given a brass tag with his number on it by the Mine Clerk. The number is always used in connection with the name both for the time and distribution.

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Fig. 162.—Form 16.

Once in 24 hours the foremen report to the Mine Clerk at the mine office, the time of the men in their charge. The clerk enters the time in his Office Time Book, form 16 (Fig. 162), a separate page being assigned to each man. These records are extended and totaled at the end of

	UTAH FUEL COMPANY TIME CERTIFICATE	
Mine No.		No
	Utah,	191
Please give b	earer	
Check No.	his time.	
Cause for leaving:	Tons Mined @	· · · · · · · · · · · · · · · · · · ·
, ,	" " @	
	Yards Entry @	
	Days @	
	Hours @	

Fig. 163.—Form 17.

each month. Men quitting or discharged are furnished with time certificates (form 17, Fig. 163) by their foreman, and on presentation at the mine office, their account is made up and they are paid with a Time Check (settlement).

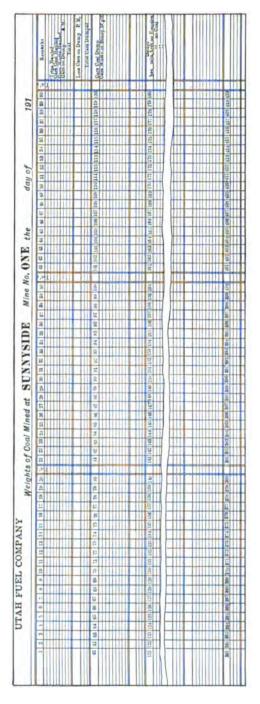


Fig. 164.—Form 18.

All pit cars are weighed by the weighman as they come out of the mine. These weights are entered on a Tonnage Bulletin (form 18, Fig. 164). For the information of the miners this bulletin is posted up at the mine office after each day's run, so that each man may know just what his output has been for the day. In entering the cars on this bulletin, the tonnage of each man is entered under the check number that has been assigned him. The earnings of each man each day, who is working on a tonnage basis is posted from this bulletin to the time book.

Record of Yardage.—Employees working on a yardage basis have their work measured up at the end of each month by the Supt., or mine engineer. These measurements are turned into the office, showing place, Feet, Yards, Rate of pay, and whether the yardage has been made in rooms, entries or other openings, and the employee to receive credit for the yardage. This record is entered in the Record of Yardage book, form 19 (Fig. 165), and is the basis on which contract miners are paid.

	Check			ایوا	Yards		Rata	_		
Place	No.	Name	Division	Feet	Rooms	Entries	Rate per Yard	Remarks		
			-							
			-							
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	<del></del>				$\overline{}$	$\overline{}$				
	-									
			_							

Fig. 165.—Form 19.

Record of Coal Mined.—This book, form 20 (Fig. 166), which is used for the purpose of keeping an individual account with each employee who is working contract, either on a tonnage or yardage basis, is posted up each day. The tonnage figures are taken from the Tonnage Bulletin, the yardage from the Yardage Record at the end of the month. The charges against employees such as Coupons are posted each day, charges for Rent and Medical Dept., are posted the first of the month, and charges for Material, Fuel, Smithing and Board are posted at the end of the month.

Labor Distribution.—The Distribution of Labor for all employees is made by their foremen at the time their time for the day is entered in the

Time Book (form 15, Fig. 161). It will be noted that the Time Book is designed specially with this feature in mind, a division of each man's labor being shown for each day. This Distribution of Labor, of course, is made out according to the schedule of accounts and sub-divisions thereof called for by the mine books. This distribution as furnished by the foremen is a plain statement as to what the men are doing and a division

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AMOUNT					_	_											_														_	
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Fig. 166.—Form 20.

of their time in accordance therewith. When this distribution is reported to the Mine Clerk for entry in the Office Time Book, he will also show in connection with the information furnished by the foremen, the account or sub-division chargeable, and rate of pay therefore. At the end of the month the time and earnings are extended in the Office Time Book for each job. This Office Time Book furnishes not only a record of the time but also a distribution of labor for each employee.

Pay-roll.—The Pay-roll, form 2 (Fig. 167), is made up from the Time Book and the Record of Coal Mined book. Employees names are entered

FIG. 167.—FORM 2.

in numerical order according to their check numbers. After earnings have been posted to the Pay-roll, all Time Certificates issued in settlement during the month will be checked and posted in.

Deductions are posted as follows:

Medical Dept.
Smithing from Material and Supplies Used Report
Material from Material and Supplies Used Report
Fuel from Material and Supplies Used Report
Rents from Rental Records
Board from Boarding-house report
Coupons from Coupon Book
Pay-roll Deficiency from previous month's roll
Coupon deficiency from previous month's roll.

A deficiency occurs by employees overdrawing their accounts, and may come about in two ways. As an example, say an employee has earned \$60.00 and after all deductions have been made, except for say material account, he would have a credit of say \$5.00; now if the charge against him for material is \$7.00 the rule is to make this deduction, but by doing so the account will be overdrawn, in this instance \$2.00. This constitutes a Pay-roll deficiency, which will be collected the following month.

By following this rule all charges against employees are collected and the proper accounts receive credit the same month that the charge is made. The other example is when the coupon account is overdrawn, and in a case of this kind it is handled in the same way as the previous case except that it is shown as a coupon overdraft.

An itemized list of the Pay-roll deficiency is made out with an explanation of each case and forwarded to the Auditor with the Pay-roll.

Pay-rolls are made out in duplicate, a copy being forwarded to the Auditor. The Pay-roll is certified to by the mine Supt., before being forwarded to the Auditor and before being paid must be approved by the General Supt., General Manager, Auditor and Vice President.

After the Pay-roll is complete and a copy forwarded to the Auditor, statements (Fig. 168, form 22, dockets), are made out for each employee. These statements are distributed to the men as soon after the first of the month as possible.

On pay day these dockets must be presented to the Paymaster properly signed, for which they will receive their pay in cash.

If the total amount of the Pay-roll is not paid out on pay day by the Paymaster, the balance is returned to the General Office and placed to the credit of "Unclaimed Wages." Employees calling for their wages after pay day, are paid in cash by the mine Supt., who accepts the statement as a receipt and forwards the same to the General Office as a cash remit-

tance. The Treasurer will make an entry in his books charging "Unclaimed Wages" and crediting Cash with the amount.

Form 438-B 2-15-10 5M	I Roll	<b></b>	Name		<b>x</b>
			FERABLE	•	_
Sign in Ir	k PERSONA	LLY a	and Present	on PAY DAY	
Statement for Mont	h of				19
	IN AC	XXX	T WITH		
	UTAH FU	JEL	COMPA	NY	
	AT CAST	LE G/	ATE MINES		
Labor	Dam	<u> </u>			11
	Days, Hours,				
"	Trips.				
"	Ovens,	<b>&amp;</b>			
Driving Entry		-Yards,	. @		
" "		- **	` <b>@</b>		
Cars			•		
		- <b>"</b>	@		
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	TOTAL EAS	KNINGB	·		
Medical Department_				.	
Smithing					
Fuel and Material				-'	_
House and Ground Rea					
Board				-11	
Insurance				-:	
Coupons, Current Mont				·	
Coupon Balance last M	Ionth			·[	
				-	<del></del>
	TOTAL EX			1 1	
	TOTAL EX	PENSES	<u>,                                      </u>		
	BALAN	ICE			
R	eceived paymer	nt in fr	ull of above a	ccount	
			•		
Sign here					
Witness					

Fig. 168.—Form 22.

Pay-roll Deductions.—A detailed statement of deductions made on the Pay-roll is made up in duplicate and a copy forwarded to the Auditor with the Pay-roll. This statement form 23 (Fig. 169) shows deductions made, and the deductions set out in detail. On the reverse side of the sheet the deductions are summarized. The statement is journalized, crediting Pay-roll with the gross amount and debiting sundry accounts with the distribution.

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DEDUCTION	AMOUNTS TOTALS	7		100						I											
MEMORANDUM OF PAY ROLL DEDUCTIONS	IN WHOSE FAVOR	Lod. and Co.'s Direct Charges	** Medical Department	** Cost Sales	ri Bante	** Bearing House Receipts	14 Boarding Rouse Fixtures	** Depreciation of Animals	** Pay Rell Deficiency	Bills Oulteethle	No.	Wassish Store On Convent	Transferred groups were group former		Insurance				Other Deductions		
				TOTAL	DEDUCT	1039															
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Fig. 169.—Form 23.

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Distribution of Pay-rolls at

# UTAH FUEL COMPANY

Ordinary Entry and Room Tracks Proportion Power House Expense Hoist and Locomotive Tracks Taking up Old Rails and Ties COAL EXPERSES Yardage in Straight Coal Yardage in Coal and Rock Yardage in Straight Rock Repairing Worn Out Cars Repairing Wrecked Cars 5 REPAIRS TO TRACKS Repairs Interior Wiring REPAIRS TO CARS Replacing Lost Cars ELECTRIC LIGHT ENTRY DRIVING Attendance Elevators, Screens, etc. Runn'g & Rep'ng Box Car Loader Damage to R. R. Cars and Tracks Proportion Power House Expense Unloading Dust and Yard Waste Harness Repairs and Shoeing Roller Repairs and Renewals COAL EXPENSES Repairing Haulage Entries Outside Foreman's Salary Cleaning Haulage Tracks Repairs Haulage Signals Weighmen and Topmen Couplers and Spraggers Running Chute Engine Loading by Day Labor Cleaning Yard Tracks Pushers and Dumpers Loading by Contract Clearing up Wrecks Cost Dummy Doors Car Handlers LOADING Proportion Power House Expense Drilling, Shooting and Loading Tamping and Powder Boxes COAL EXPENSES Day Work Machine Mining Proportion Stable Expense Contract Machine Mining Roller Men and Greasers Ladders and Tool Boxes EXPENSE OF MINING Underground Hoistmen Couplers and Spraggers Loading Company Coal Running Man Trip Outside Hoistmen Sharpening Tools Locomotive Men Shot Inspectors Earth Tamping Rope Runners Hand Mining Powder Man Check Man Interpreter Wire Man 2 HAULING Drivers

Fra. 170.

COAL EXPENSES	COAL EXPENSES	COAL EXPERSES
Allowance for Boney Coal or Rock Allowance for Rolls Allowance for Water	11 TIMBER AND PROPS Driving Entries and Rooms Retimbering and Robbing Rooms Repairing Haulage Entries Repairing Air and Traveling Ways Tribosting and Phing	14 REPAIRS MACHINERY Boilers and Connections Steam Lines Stationary Steam Engines Steam Hoisting Engines Electric Hoisting Engines
8 ROOMS AND ROLLS Rooms Turned Allowance for Rolls in Rooms Allowance for Brushing Roof Allowance for Boney Coal or Rock Allowance for Water	Hauling and Sawing Loading and Delivering Drawing Props  12 DEAD WORE	Air Compressors Electric Generators Electric Locomotives Miscellaneous Electric Motors Outside Pumps Underground Pumps Outside Water Lines
9 VENTILATION Proportion Power House Expense Gas and Air Inspectors Fan Expenses and Engineer Building and Repairing Stoppings Brattice Cloth and Bratticing Building and Repairing Mine Doors Trappers Cleaning Air Ways Repairing Air Ways	Regrading and Brushing Entries Prospecting Faults Loading and Hauling Rock Dumping and Stowing Rock Underground Inspection Repairing Company Tools Cleaning Camp 13 REPAIRS TO BLDGS. AND CHUTES Main Chute and Trestle Crusher, Elevator and Screen Bldg.	Outside Air Lines Underground Air Lines Outside Electric Power Lines Underground Electric Power Lines Fans and Fan Engines Proportion Crushers, Elevators, etc. Typples and Screens Renewal Wire Ropes Mining Machines Machinery Inspection Telephone Lines Wagons Prop'n Salary Gen'l Master Mech.
10 DRAINAGE AND WATER'G MINE Proportion Power House Expense Outside Pumps and Pumpmen Inside Pumps and Pumpmen Water Men and Supplies Ditches and Sumps	Power and Boiler Housee Engine House Barn and Corral Buildings Boarding Housee Blackemith and Machine Shops Other Mine Buildings R. R. Track and Mine Scales Hospital	15 SUPERINTENDENTS AND CLERES Prop'n Gen. and Mine Supt's Salaries

Fig. 170.—Continued.

COAL EXPERSES	COAL EXPENSES	COAL EXPERSES
Mine Foreman Mine Clerks .	Repairs to Tracks Flectrio Light Entry Driving Rooms and Rolls Ventilation Drainage & Watering Mine	CAPITAL CHARGES Tramways, Chutes & Trestles Cars and Tracks Power and Machinery Buildings Coke Ovens
16 ENGINEERING Mine Surveyors and Assistants Office Supplies Outside Expenses	Timber and Frops Dead Work Repairing Bldgs. and Chutee Repairs Machinery Superintendents and Clerks Engineering General Expense	Tends
17 GENERAL EXPENSES Janitor Service Sundry Supplies Office Fixtures Fring Office Hester	Incidentals	
18 INCIDENTALS Miscellaneous Teaming Pay Day Expenses Free Coal	Total Expenses Mine No. Total Expenses Mine No. Total Coke Expenses Material and Supplies	CHARGES TO OTHER MINES
wateuman Guard and Special Service Ex. Rescue Apparatus	Coal Sales Coarding and B. House Exp. Individuals and Co.'s Saw Mill Account Medical Dept. Water Surnly Account	Total Amount of Roll
RECAPITULATION Expense of Mining Hauling Londing	Depreciation of Animals	Correct:
Repairs to Cars		Mine Superintendent.
	Tree 170 Continued	

'19. 170.—Continued.

# UTAH FUEL COMPANY

DISTRIBUTION OF PAY ROLLS AT

COKE OVERS, FOR MONTH OF

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		Londing R. R. Cars by Day Labor	Store and Tool House	
		Car Handlers	Stale Messe	
41 SUPERINTERINARY & CLERKS		Cleuning R. R. Tracks	Treaties and Bridges	
Prop'n Gen. & Oake Supi's Sal.		Damage to R. R. Cars and Tracks	Buberintendent's Office	
Cake Oven Portumen.		Expense and Repair Tools		
Propertion Office Clerks	L	Walehing R. R. Cars		
Properties Office Supplies				
TimeBeeper				
			To Coke Bronsmittee	
		46 LOADING CINERES	Present of Cabine	
		Loading and Unloading R. R. Care	Transportation on Samulas	
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Repairing Motor and Power Lines			Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Se	
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Levelars	-	A BUPATHS TO COKE AVEN	Charalas Ores	
		Brick and Pize Clay	Burning and Drawing	
		Stone Lime atc.	Loading Coke	
44 BURNING AND DRAWING		Cast Iron Ipoe Frames	Loading Cinders	
Coke Pullers		Benecking Ovens	Miring Cold Owens	
Plastering Oven Doors		Renaire Dock Walls	Repairs to Cate Owene	
Proportion Power House Expense			Rebairs to Buildings	
Propertion Pumping Rapense			Colle Manuelments	
Repairs Oven Water Line			Incidentale	
Repairs Tools				
Charging Hole Covers				
	_			

Fig. 171.—Form 25.

Pay-roll Distribution.—A distribution of the Pay-roll accounts is made up of forms 24 (Fig. 170) and 25 (Fig. 171) from the Office Time Books. The different amounts chargeable against each account or subdivision are segregated and entered as a total on this sheet, as a charge against the account or sub-division affected. The total amount of the distribution as shown on the report must agree with the gross earnings as shown by the Time Books and Pay-roll.

Separate statements are required for the mine and coke ovens.

These statements are journalized, the total as a credit to Pay-roll account and the distribution as debits to sundry accounts. These statements are made out in duplicate, copy being forwarded to the Auditor.

Supplies Purchased.—All material and Supplies are purchased by the Purchasing Agent located at the General Office. All purchase orders are issued in triplicate. The original copy goes to the vendor, the duplicate copy to the office files and the triplicate to the mine office, for which the supplies are purchased.

Material is purchased only on receipt of requisition from the mine properly signed. These requisitions are made out in duplicate, the origi-

Date	Quantity Purchased	Cost	Fgt.	Hamb Hag	Total Cost	Order No.	Amo	mi	Date	Quantity Used	Amo	unt	Assertat No.
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Fig. 172.—Form 26.

nal copy going to the Purchasing Agent and the duplicate remains on file at the mine office.

Supplies-stock Records.—In order to keep an accurate record of all material purchased and used, a loose leaf ledger, form 26 (Fig. 172), is used. A separate page is assigned each item or kind of material received. Entries are made to this record from invoices covering material purchased. Each item is entered as to quantity, and invoice cost also its proper proportion of the freight charges on the shipment, to cover the expenses of handling supplies at the mine, an amount is added to each item. The sum of all these items gives the cost at the mine, from which the cost per item is derived for use in charging out.

Material and Supplies used are posted as credits to the stock ledger from the Report of Material Used, form 28 (Fig. 174).

All Coal used in the boilers and for heating purposes at the mine, is

charged to the Material and Supply account by journal entry, crediting Earnings. From the Supply account it is charged out the same as any other material.

Supplies Used.—Supplies are issued by the Supply Clerk only on presentation of a Supply Order (form 27, Fig. 173) properly signed.

10-4-11-50 Bks-R. P. Co.	Form 374 UTAH FUEL CO.	No
M. & S. CLERK:  Please deliver to——— the following material:		tah,191
the following insterior.	Price Amount	For What Purpose Used
How paid:		Clerk

Fig. 173.—Form 27.

These orders are in duplicate, the second copy being retained by the party issuing the same. The items on these orders are priced from the stock record, and the amounts extended, at the same time they are entered on the stock records as credits to the stock accounts affected.

Accou	int No.	7-11 R. P. Co.  No account				Sheet No
Date	Order No.	Description of Material and Supplies Used	Quantity	Price	Value	For What Purpose Used

Fig. 174.—Form 28.

Supply Orders after being entered in the stock records are posted to the Material and Supplies Used Records (form 28, Fig. 174), being charged to their proper account or sub-division as the case may be. The charges as shown by this record are summarized and journalized at the end of the month.

From this detailed Record of Supplies Used there is made up each month and forwarded to the Auditor a Report of Materials and Supplies Used, form 29 (Fig. 175).

		UT	٩н	Fl	JE	L C	00	MF	PANY	
Report of all Materials and Suppl	ise used in Op	ratio	w _						Moss for Month of	
DESCRIPTION OF MATERIALS AND SUPPLIES USED	QUANTITY	PRIOR	VAL	UR	746	REC	AP.	Ã No.	OCOUNT CHARGRANT	FOR WHEN PURPOSE USED
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Fig. 175.—Form 29.

Staten	nent of	Local (	loal S	ales a	DR		CR.		
	SOLD TO	,		WEIG	HT	TO WHOM SOLD AND HOW COLLECTED	WEIGHT	RATE	AMOUN
Do hand fre	m previou	t month			Г	Employes Pay-Roll Deductions			
						Cash Sales-B/C vs Mine Sup't,			
Date set for	Local Sale	s and free (	lool			Other Sales-B / C vs			
us per Welgi	ht Tickets								
DATE (	CAR NO.	INITIAL	KIND				$\Box$		
					-	FREE COAL:	1		╂─┼
	$\overline{}$				<del>                                     </del>	Employes etc, per detail on	1-1-1		
-						back of Output Report			
						Boarding House			
						Store & Office Bldg.			
						Various Mine Bldgs.			
						Hospital			$\vdash$
					-	Loss in Weights	<del>                                     </del>		<del>                                     </del>
	<del></del>					On hand last day of month			
		T	otal			Totals	· ·		

Fig. 176.—Form 30.

A detailed statement of the local Coal sales is made up monthly and sent to the Auditor (form 30, Fig. 176).

All fuel shipped to the Coke ovens for making Coke is charged out through the supply account, and at the end of the month the total amount so charged is journalized, debiting Supply account and crediting Earnings.

Invoices.—All invoices come to the Purchasing Agent, who checks

prices and terms. The original and duplicate copies are forwarded to the mine receiving the material in question. The Material Clerk checks against the material received and also the purchasing order and if correct he O. K.'s. Each invoice is then entered in the stock ledger, giving all information called for. The original invoice is then forwarded to the Purchasing Agent, by him turned over to the Auditor for Vouchering, it then goes to the Treasurer for payment.

A record of all orders placed is kept by the Purchasing Agent, showing the Requisition and Order number and date, who ordered from and information regarding the receipt and forwarding of the invoices. See form 31 (Fig. 177).

Req. Order				Invoices received and transmitted.							
	1 1		Ordered from	Material and Supplies	- ig	То	From		Invoice.		
NO.	Date	Date No. Dat	Date	Сирупа	Recd	Mine	Mine	To Auditor	Date	Amount	
			•								

Fig. 177.—Form 31.

Bills Collectable.—These bills are really accounts receivable of a sundry nature. They are made out to cover rent due from tenents not in the employ of the company, providing it has not been paid in cash when due, also for material, fuel or labor furnished to individuals.

Boarding House—Record of Meals Served.—This record is kept on form 32 (Fig. 178) by the boarding-house manager. All meals furnished whether free, chargeable or cash, are accounted for. The manager fills in the name of each person he boards, his check number, if an employee of the company, and the number of meals served to him each day; the balance of the information called for is filled in by the Mine Clerk.

 board until the order is returned to the office upon his leaving the boarding house, by the employee of the company.

Reco	ord of	f Me	als	Se	rv	ed s	ıt			****					
NAME	Ch. No	No		ATE		Room B	lant	Total			_	A COL	LECT		
		Meals	řě.	ř	lost			Celle	*	Pay !	Rell	J	<b>A</b>	3	.a.
		1		l						j					
											$\Box$		П		
		<u> </u>		$\vdash$	Ы	ᇤ	=				Ш		$\vdash$		
														$\equiv$	

Fig. 178.—Form 32.

Boarding House—Receipts and Expenditures.—A monthly report, form 33 (Fig. 179), covering the receipts and expenditures on account of

EXPENDITURES	AMOUNT	RECEIPTS	AMOUN2
Miles on Hand from Last Month		Pay Roll Deductions	<del>T-1-1-</del>
Provisiona			<del>                                      </del>
Groceries	<del>                                     </del>	Bills Collectible vs. Mine Sup't for Cash	<del>+   -   -  </del>
Monte		3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	<del>                                      </del>
Milk		** ** \$45.	1111
Less Mass on Hand			
Labor			<del>                                      </del>
Manager's Salary (prop'n of)			
" Expense " "			
Cooks-Number of			<del>+                                      </del>
Walters			
Janitore			
Other Expenses	<del>                                     </del>		<del>                                      </del>
Coal Tone at		Pres Meale Furnished	
Laundry		6 4 6	
Cooking Utensile		et es es	
Pixtures and Repairs		Charged to Mine Expenses and Credited to	
		Bearding House Receipts	
Total Expenditures		Total Receipts	
Galin	<del>                                     </del>	Loss	+
No. of Meals Served and Collected for on Pay	P.V.	Amount Bealtsed for Each Meal Served	
u u u u u by Bill			el
Free to Employee			ta.
Total Moals Served			ela.
200- 200- 00/100		Total Cost	
		Gain or Loss per Meal	

Fig. 179.—Form 33.

the boarding house is made out in triplicate by the mine clerk. Original to the Auditor, duplicate to General Manager, triplicate to Boardinghouse manager. This report is made up from and checks with the boarding-house accounts in the ledger.

		Г	_			П		
			REMAKKS					
	House No.	9				1	$\Box$	$\exists$
	N	LLECTI	-SH Ce			止		
ы	Ť	HOW COLLECTED	AY ROLL CASH Collegia		_	╟	-	-
MIN			4 AV			1		
		LHBU	MONT					
		CHECK	NO. MONTH	j				
	Owner		LEBBEL					
		MUNCH	181	anuery.	obruary		November	December
RECORD OF RENTS COLLECTED AT			MEMARKS					
8	House No.	2	On less big			$\mathbb{F}$		_
RENT	N een	HOW COLLECTED	CABN			1	F	
9 -	Ť	HOW C	AY ROLL CABH			忙		
OR OC		ı	ě			H		
RE		NO.	NO. MONTH			-		
		CME	î	L	Н	╬	L	
	Owner		13631					
		76.80%	=	January	Pobruary		November	December

FIG. 180.—FORM 34.

Rent Record.—A record is kept on form 34 (Fig. 180), of the rent account with each dwelling house of the company, showing the lessee, check number, rental value, how collected and remarks. Entries are made on these records when houses are assigned to employees and again when they are vacated. The monthly rent is posted from and to the Pay-roll or Cash Book as the case may be.

Statement of Rent Account.—A Statement of the Rent Account is made out monthly on form 35 (Fig. 181), by the Mine Clerk and forwarded to the Auditor with the Pay-roll. This statement covers the amount of rent collected, how collected, house number and lessee. All dwellings are listed on this statement in numerical order and if vacant a notation is made in the remarks column.

House	0	Rent this		How Colle	cted	D						
No.	Occupied by	Month	Pay-roll	Cash	Bills Collectable	Remarks						
					1 1							
		RI	ENT ROL	L								
					I							
Mine												
					I I							
	month, w port it. This at collection record ke Bills Cc office thr paid thro When r and expli Rents i should be	every house newhether occupies atement shou as on Pay-roll opport at the minollectable must be supply and the supply and the supply and the supply and the supply and the supply are supply and the supply are supply and the supply are supply and the supply and the supply are supply and the supply are supply and the supply and the supply are supply and the supply are supply and the supply are supply as a supply and the supply are supply as a supply and the supply are supply as a supply as a supply are supply as a supply as a supply are supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply	nstructions umber in co ied or vacant ild show all i is, Cash and es. t be made a channel for deduction or in a full mont head of "Re youchers acc "giving nam	onsecutive on and if varents and Bills Colle and forward all rents d Cash. the give numernarks."	order each cant so re- agree with ctable and led to this ue and not ber of days collections etc.							
	month, w port it. This st collection record ke Bills C office thr paid thro When r and exple Rents i should be Send s	every house newhether occupies atement shou as on Pay-roll opport at the minollectable must be supply and the supply and the supply and the supply and the supply and the supply are supply and the supply are supply and the supply are supply and the supply and the supply are supply and the supply are supply and the supply and the supply are supply and the supply are supply and the supply are supply as a supply and the supply are supply as a supply and the supply are supply as a supply as a supply are supply as a supply as a supply are supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply as a supply	nstructions umber in co ied or vacant ild show all i is, Cash and es. t be made a channel for deduction or in a full mont head of "Re youchers acc "giving nam	onsecutive on and if varents and Bills Colle and forward all rents d Cash. the give numernarks."	order each cant so re- agree with ctable and led to this ue and not ber of days collections etc.							

Fig. 181.—Form 35.

Animal Report.—A monthly statement covering all animals at the mine is made out on form 36 (Fig. 182) and forwarded to the General Manager, showing Name, Condition, working or idle, etc., on the reverse side of this statement is a recapitulation showing, animals at work, on the range, killed or sold, etc.

Form		-			Mı	A	NIMAL	OMPAN REPORT	-		191
No.	å K	ind	Ht.	Age	Wt.	Condition	k or	Killed or Injured	Name of Man in	Sold or Trans- ferred	
	ege K					Sp.	Work of Idle	Injured	Charge	То	Amt.
	-				-						
	An An An	imal imal imal imal imal	s on s pu s kil s tra s at s on T	rangurchau led au unsfer mine rangurchau of Au	e firs	during nold during not of mo and————————————————————————————————————	onth— nonth— ng mont nonth— onth— onth— onth— onth— onth— onth	month—sont sect. sonth sect. sing during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut barn during nut b			
	B; Giv		use	of De	ath o	or injury	to each	Animal			
Соттес	t-				Min	e Supt.	A	pproved		Veterinaria	n.

Fig. 182.—Form 36.

Animals—Killed and Sold.—A monthly report of Animals killed and sold is made out in duplicate by the mine clerk on form 37 (Fig. 183).

The original copy goes to the Auditor. Animals purchased are shown on the debit side and animals killed or sold shown on the credit side. This report is a detailed statement of the Animals Killed and Sold Account in the ledger.

Balance from last month	Balance from last month
Balance	Charge Hauling
Animals at mine first of month	
Animals on range first of month	
Animals purchased during the mont Animals Killed & Sold during mont	
Animals at mines last of month	
Animals on range last of month	
Total on hand	
Γα	Correct

Fig. 183.—Form 37.

Forage Report.—A monthly report (form 38, Fig. 184) is made out showing the receipts and consumption of Hay and Grain during the month, Medicines, Barn labor, etc. The original copy goes to the General Manager and the duplicate to the Auditor.

Nationality Report.—At the end of each month a Nationality report is made out in triplicate covering the force employed. The information for this report is taken from the pay-rolls where the nationality of each man is noted. Original copy goes to the Auditor, duplicate to the General Manager and triplicate to the Superintendent. See form 39 (Fig. 185).

Daily Report of Mine Operations.—At the end of each day's run a daily report of operations is made out in triplicate (form 40, Fig. 186). The original copy going to the Auditor and the Duplicate to the General Manager.

This report covers the Force employed, Animals working, Shots fired and missed, Cars dumped, Trips run, Amount of Coal mined, shipped and on hand according to grades, also the time the mine worked, delays and the cause.

Daily Report of Coke Oven Operations.—A daily report covering the operation of the Coke Ovens is made out in triplicate (form 41, Fig. 187). The original copy goes to the Auditor, the triplicate to the General Manager.

		UTAH	f FU	EL CO	MPANY				
Report of Barn Suppli	es and Se	rvice At			Min	e			191
noyen or a many mapper									
	BRAH	OUNDS GRAIN	DATE	ALFALPA	POUNDS HAY	TIMOTHY			
On Hand Piret of Mouth			•		I		Aver.	No. A	nimals Fed Per Day
Received During **								~	** Working in Mine
TOTAL								44	e Outside
Fed During Month					L		<u> </u>	**	es Not Working
Bold ** **				L					
TOTAL				l	L		No.	لمصلحة	s Killed
				l				**	Injured
On Hand Last of Month							**	••	In Burn
Fed Per Animal Per Day								- 44	In Pasture
Total Amount Expended for La	bor \$								
Ma	dicine \$								
Cost Per Animal Per Day	: Grain	Hay	La	bor :	Colloine	Total			
Medicine on Hand Last of Mon	th								
									•
Correct					pproved				
- Anton				_	ra				
	X	no Bupt.							Verterinarina

Fig. 184.—Form 38.

UTAH FUEL ( Report of Me					М	ine	 	191
NATIONALITIES	Miners in Mine	Day Mon in Mine	Day Men Outside	Supt. Mine Ferenan Clerks, Ups, Janiter	Ooko Oven Men	Mon on Construction Work		TOTAL
American								
German								
Finn								
Swede								
Austrian								
Slave								
French								
Italian								
Greek								
Negroes								
Mexican								
Japanese								
Chinese								
TOTALS								
Original to Deplicate to Triplicate to	Auditor Gen'i M Gen'i S	gr. upt.					 	Mino Supt.

Fig. 185.—Form 39.

Daily Report of Mine Opera	ations			dine No			191
Men Employed	Inside	Out- side	Total	Mi	scellaneou	15	No
Miners	-i			Animals in	Mine		_
Drivers	_			" O	utside		
Trappers and Couplers				" N	t Workin	ng	_
Hoist and Ropemen				" On	Construc	tion Wo	rk
Other Day-men				Shots Fired			
	—i ——			Shots Miss	ed.		
Machinists and Helpers				Mine Cars	Dumped	(Coal)	
Pumpmen				**		(Rock)	
Engineers and Firemen							
Crushermen				Trips Made	by .	Hoi	st
Pumpers and Pushers				**	•	••	
Couplers			1			**	
Coal Loaders			!			••	_i
Other Day-men			1			••	
			1			•••	
Construction Work					-		
Boarding House							
Supt., Mine Foreman							
Clerks and Janitor	1		·				
Clerks and Janitor TOTAL							_
Clerks and Janitor TOTAL COAL MINEI	o, shippe	D AND	ON HA	AND NOT	BILLED	OUT	
TOTAL	o, shippe	D AND		AND NOT	BILLED		
TOTAL			1	Shipped	On H	land	
TOTAL  COAL MINE		Mined ars			On H		
TOTAL  COAL MINEI  Kind of Coal		Mined ars	1	Shipped	On H	land	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump		Mined ars	1	Shipped	On H	land	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump		Mined ars	1	Shipped	On H	land	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "		Mined ars	1	Shipped	On H	land	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack  Dust		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack  Dust		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack  Dust  Dust Wasted		Mined ars	1	Shipped	On H	Tons	
COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack  Dust  Dust Wasted  Coal to Boilers (kind)		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack  Dust  Dust Wasted  Coal to Boilers (kind)  Coal to Coke Ovens		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack  Dust  Dust Wasted  Coal to Boilers (kind)  Coal to Coke Ovens  Local Scales (kind)		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack  Dust  Dust  Dust Wasted  Coal to Boilers (kind)  Coal to Coke Ovens  Local Scales (kind)  Railway Engines (kind)		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway "  Run of Mine  Smelter  Nut  Slack  Dust  Dust  Dust Wasted  Coal to Boilers (kind)  Coal to Coke Ovens  Local Scales (kind)  Railway Engines (kind)  Company Mine Buildings		Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway " Run of Mine  Smelter  Nut  Slack  Dust  Dust  Coal to Boilers (kind)  Coal to Coke Ovens  Local Scales (kind)  Railway Engines (kind)  Company Mine Buildings  Rock and Waste  TOTALS	Coal	Mined ars	1	Shipped	On H	Tons	
TOTAL  COAL MINEI  Kind of Coal  Commercial Lump  Railway " Run of Mine  Smelter  Nut  Slack  Dust  Dust Wasted  Coal to Boilers (kind)  Coal to Coke Ovens  Local Scales (kind)  Railway Engines (kind)  Company Mine Buildings  Rock and Waste  TOTALS	Coal	Mined ars Box	1	Shipped	On H	Tons	

Fig. 186.—Form 40.

This report covers the Force employed and statistics regarding the operation of the ovens, the production and disposition of coke according to grades, etc.

Form 4	189-1-12-11-2M-R. P. Co. UT	'AH	FU	EL	C	OMPA	NY		
Daily 1	Report of Coke Oven Ope	ration	8.			Sunnysi	de,		191
		Fire	st Cla	.88	G	as Coke	Screenings	1	otal
	Production								
	Loaded in R. R. Cars							1	
Disposi- tion	Docked							-	
Ä	Total	-			=				
В	rought Forward						<u> </u>	-	
	otal							-	
Coke	Billed	Cars	l		Cars	1	Cars	Cars	
8	Loads Unbilled						· · · · · · · · · · · · · · · · · · ·	-  -	
82	Part Loads						-		
Balance Hand	On Docks								
B	Total							1	
	<u>'</u>			<del></del>	11		Men Employ	red	
No. Ov	ens Pulled and Charged			ļ	-	Superint		1	
No. Ov	ens Pulled Only				_  -	Foremen			
No. Ov	ens Charged Only				_  -	Clerks			<del></del>
	ens Idle Account Repairs				_  -	Weightm	nen		
	ens Lost Account Not R	eady			_  -	Bin Men			
	ens Lost Account				_  -	Larry M	en		<del></del>
	ens Lost Account				_  -	Cart Mer	1		
	ens Burning				$- \parallel \perp$	Car Drop	opers		
-	ens in Operation				$-\ _{-}$	Blacksm	ith and Helpers		
	ens Not in Operation				_  _		nd Helpers		
	tal Number of Ovens			<u> </u>	-  _		d Water Men		
	Slack Record	1			11_		g Oven Doors		
			_		-11-	Other D			
_	t Forward	<b></b> -∤	Cars	To	<u> </u>		mpany Men		
	Oumped tal		_		-  -	Coke Pul			
Black C					-  -	Coke Lo		ļ	
	e in Bins			-	-i -		Number Men	¦	
						10041	dinner wied	<u> </u>	
Rem	arks:								
						-			
				_	==				
				=					
	_					8u	perintendent of	Coke O	vens
							_		

Fig. 187.—Form 41.

Monthly Report of Operations.—This report (form 42, Fig. 188) is made out in triplicate at the end of each month, the original copy going

UTA	H	FL	JEL	CO	MPANY		
Average Report of Operations			Л	line 1	VoMonth of	191.	•••••
	ıth		Last	Year		ફ	uth
Mine Operations	This Mo	Average Tonnage	Same Month	Average Tonnage	Mine Operations	This Month	Same Month
No. days mine worked					Avg. No. trips made by		
Total tons coal mined					Hoist	!	¦
Total mined from pillars				·	••	<u> </u>	-
" " entries and rooms							1-
Average No. men in mine					**		i
Miners					11		-
Day Men							
Drivers				l		<u> </u>	
Hoist and rope men						¦	-
Trappers and couplers					No. cars loaded	¦	
Animals in mine		<u> </u>			Coal-		
Average No. men outside	_				Box	_	
Day men					Percent. coal cars		
Coal loaders		_			" box cars		1-
Dumpers and top men					Commercial lump		1
Couplers					Railway lump		-
Engineers and firemen		$\overline{}$		<u> </u>	Run of Mine	-	-
Men hauling props					Nut		i-
Powder used					Slack		1-
Pounds Hercules	_	-			Dust	-	1-
" black					Local Sales	-	¦
No. shots fired					Coal to boilers	-	1-
" " missed		-			Dust wasted at mines		-
No. mine cars dumped coal					Rock and waste		-
" " waste	_				Hours idle account of		1-
No. hours delayed acct.	_						
COKE OVENS					COKE OVERS		-
	_	-					<u> _</u>
Avg. No. Co. day men " " coke pullers	_	<u> </u>		ļ	No. days ovens worked "tons coal charged		<u> _</u>
						l—	- -
" Levelers		$\vdash$			coke made		<u> </u>
		<u> </u>			Avg. tons made per day		
storing coke	_	-			Percentage of coke to coal		.
No. cars coke loaded		<u> </u>			Avg. No. ovens charged		_
No. ovens delayed acct.					" " drawn No. tons coke stored		

Fig. 188.—Form 42.

to the Auditor, and the duplicate to the General Manager. The report covers statistics of Force employed at both mine and coke ovens, also tonnage for the month, previous year, etc.

Weighmasters Report.—All railroad cars loaded are weighed and recorded on a track sheet (form 43, Fig. 189) made in triplicate. The, original copy goes to the Auditor, the duplicate to the Chairman of the Local Freight Bureau, the triplicate copy remains on file. Regular Bill of Lading covering coal shipped is made out from this report.

Instructions for filling out the forms are printed at the bottom.

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Form L. U. I	. в. 18		ı iT		origin Ei IE		$C \cap$		Form U. ANY	F. Co.,	, 4/8.	7-12-10-	-10m
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Fig. 189.—Form 43.

Shipping Report.—A daily Shipping Report (form 44, Fig. 190) is made out in duplicate original copy to the Auditor and duplicate to the General Sales Agent, this report is made up from the Weighmasters reports. There is also added by the Auditor the earnings of the shipments shown.

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FIG. 190.—FORM 44.

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IG. 193.—FORM 47.

REPORT OF	FUEL COL	ID DIST	rrie						
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Balance on hand from lest month,			_			_	ļ		
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Mined Plus Percentage Deducted,			-			<del> </del>	-	-	<del> </del>
		Total,							
Less Less in Weights,							_		
Plus Gain in Weights, Total.			_			-		<b>-</b>	<u> </u>
1000,					_	-		_	_
DISTRIBUTIO	N	-		_					
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41	Nut Black er t	lement net							
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D. & R.G. R.B. Engines at Mines ( Per Coal Tickets)	Lamp								
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Sold at Mines (Per Leval Sales Report)	Lump					├	-		
Free Coal (See reverse side for detail)						<del> </del>			<del> </del>
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Coal to Bellers,									
** ** Boarding House	Lump					Ь—			
** ** Store and Office Buildings	**		- 1			<del>  -</del>	╂		
			_			一			
Coal to Coke Oven Bins,	Black								
			_			<b>↓</b> —	_		ļ
Coal on Hand in R.R. Care	Lump	<b>.</b>				<del> </del> —	<del> </del>	├	<del> </del>
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Total to Ship							L		
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Balance on Hand				<del></del> -		<u> </u>	<b></b>		
No. Days Mine Worked	Corrects							Mine !	Tupi.
STATEMEN'	T OF FREE COA	L FUR	NIS	HED			•	(Rever	oe Side)
NAME	OCCUPATION	KIND	WEI	GHT		F	EMAR	KS	
	<del></del>								
		Total,							

Fig. 194.—Form 48.

Coal and Coke Mined and Shipped.—A daily record of the production and shipments of both coal and coke is kept on form 45 (Fig. 191). This record shows the production according to grade, also the shipments according to grade.

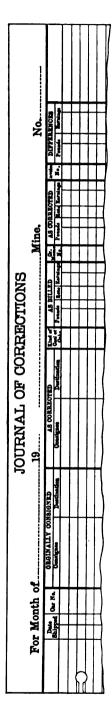
Record of Operations Mine.—This record is in book form. In it are recorded each day the production of Coal according to grades, the

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 OOAL				_						_					_				=	_
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Utah pelats via R.G. W. Ry.			$\Box$								<u> </u>									1
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 R.G. W. Ry.		_	Ш			_	_			L	L_				<u> </u>	Ш		_	<u> </u>	ļ
 D.& B.G.R.R.	$\Box$		$\sqcup$	_		_	_		$\Box$	_				Ш	_	Ш	_	_	<u> </u>	1
O.M.Ry.			11			Ц.	_			L	L.,			L	L.	L		_	L	1
0.B.L.K.K.	Ш	_	$\sqcup$	_	_	_	L_		$\Box$	ᆫ	Щ			L	L_	Ш		<u>L</u>	ــــ	-
 So.Pac.Co.	$\sqcup$	_	$\vdash$	_	_	-	L	$\Box$		$\vdash$	Ш			_	L_	Ш		L	L	4
 TOTAL	Ш		$\sqcup$	_	_	_	$\vdash$			$\vdash$	L		ш	L	╙	Ш		L	L	4
 Coal to Coke Ovens C.G.	-		₩		_	_	<b>-</b>	$\vdash$	_	<u> </u>	-	-	_	⊢	<u> </u>	$\vdash$		<u> </u>		4
 · · · Bollers C. C.	-	_	┥	_		_	Η-		-	-	-	-	-	-	⊢	Н	_	Ι	⊢	ł
" " W, Q,	$\vdash$	_	╂╼┼	-	-	-	$\vdash$	-	Н	⊢	├-	-	-	-	<del>                                     </del>	$\vdash$		├	┢	ł
 " " " C,Q,	$\vdash$	_	+	$\neg$	-	_	$\vdash$	-	Н	$\vdash$	$\vdash$	$\vdash$	-	⊢	┢	Н	_	H	╁	ł
 ·· ·· · · B.B.	$\vdash$	_	$\vdash$	-	_		-	$\neg$	Н	-	-	-	-	⊢	$\vdash$	Н	$\neg$	┝	┢	ł
 ·· · · Bounetted	$\vdash$	_	+	-	-	_	-	-	$\vdash$	Н	$\vdash$	$\vdash$	-	$\vdash$	-	Н		$\vdash$	-	t
Coal Sold at Mines			T			_				Т				$\vdash$	$\vdash$	Н		$\vdash$	_	t
 Conl Unconsigned	$\vdash$		1			_	_		-					_	_	Н		$\vdash$	_	t
TOTAL	$\Box$		$\vdash$	_	_	_	$\vdash$		$\overline{}$	_	_		$\overline{}$	$\vdash$	$\vdash$	Н		$\vdash$	_	t
TOTAL COAL	$\Box$	_				$\overline{}$					$\vdash$			$\vdash$		П		_		1
COKE	T							-											┢	1
 Utah Smelters	$\vdash$	_	1 1	$\neg$					Н	$\vdash$				$\vdash$	$\vdash$	П	$\neg$			t
· Other Industries														$\vdash$		П			$\overline{}$	ţ
Idahe		_																	$\Box$	ţ
Montana																				J
Novada																				I
California	$\Box$		$\Box$																	ĺ
 	$\Box$		$\sqcup$																	ĺ
	ш		$\sqcup$																	l
 TOTAL	$\Box$		$\sqcup$																	l
TOTAL COAL AND COKE																				J
 REMARKS:																				

Fig. 195.—Form 49.

Force employed, and misc. information regarding Animals, Shots Fired, etc. The information for this record comes from the Daily Report of Operations. See form 46 (Fig. 192).

Record of Operations Coke.—This record is in book form. In it are recorded each day from the Daily Report of Coke Oven Operations, the



number of Ovens Pulled, charged and delayed, the Coke loaded and the Force employed. See form 47 (Fig. 193).

Report of Coal Mined and Distribution.—At the end of each month a report is made out (form 48, Fig. 194) covering the production and distribution for the month. A copy of this report is sent to the Auditor.

Estimated Tonnage and Earnings.—This is a daily report made out by the mine clerk on form 49 (Fig. 195), and sent to the Auditor. This report shows the shipments classified as to grade also as to States consigned to and Railroad lines. Against the grade classifications are shown the tonnage and estimated earnings therefrom for each shipping classification.

Cash Book.—The cash book is kept in duplicate thus doing away with the extra work necessary in rewriting for report to the Auditor. The duplicate page is torn from the book at the end of each month and forwarded to the Auditor. The cash book is ruled four columns on the receipt side, these columns are headed, Sundries, Material and Supplies, Local Coal Sales. On the disbursement side, the one column that is used is headed Remitted to Treasurer.

Journal.—This book is the standard journal and used as such.

Journal of Corrections—Coal Sales.—This book is used for making correction in the weight or price of Coal or Coke shipped. In making entries in this book debits are shown in black ink and credits in red. At the end of the month the differences in the weight and earnings are journalized in the usual manner. See form 50 (Fig. 196).

Ledger.—Ledgers are not used at the mines, all accounts are kept at the General Office.

### WASATCH STORE COMPANY

This company operates stores, doing a general mercantile business, at the various mines of the fuel company. The following accounts are carried on the general ledger:

1. Treasurer

Buildings
 Store Fixtures

4. Teams and Wagons

5. Merchandise Bought

6. Merchandise Sold

7. Expense

8. Earnings 9. Vouchers

10. Pay-roll

11. Coupons, books and Stationery

12. Coupons Outstanding

13. Taxes

14. Insurance

15. Depreciation account

16. Individuals and Companies

17. Profit and Loss

- 1. Treasurer.—This account is handled by the Auditor the same as Cash. When Vouchers are paid the Treasurer is credited and Vouchers charged.
- 2. Buildings.—This account covers the cost of all buildings owned by the store company.
- 3. Store Fixtures.—This account covers the cost of all store fixtures and furniture of the company.
- 4. Teams and Wagons.—This account covers the cost of all Teams, Wagons and Harness of the company.
- 5. Merchandise Bought.—All merchandise purchased for the various stores of the company is charged to this account through the Abstract of Vouchers.
- 6. Merchandise Sales.—All sales at the stores are credited to this account. Charge sales being charged to Individuals and Companies; Coupon sales being charged to Coupons Outstanding and cash sales are charged to Treasurer, this account being handled exactly the same as the cash account. In closing the books, this account is closed into the Merchandise Bought account, in order to arrive at the actual gross earnings. The balance at the credit of this account (Merchandise sales) represents the sales at cost.

Sales Report.—A weekly report is made out in triplicate on form 51 (Fig. 197), at each store. The disposition of these reports is explained on the forms. This report covers the sales, receipts, and remittances in detail.

- 7. Expense Account.—This account gives all salaries of store employees and all other expenses incurred for the operating or maintaining the stores of the company including depreciation charges.
- 8. Earnings.—The monthly gross earnings of the different stores of the company are estimated separately, based on the per cent. of gross earnings to sales for the previous six months, and entry is made charging Sales and crediting Earnings. Inventories are taken every six months and any adjustment necessary is made at that time.
- 9. Vouchers.—This account is credited with all Vouchers passed to the Treasurer for payment, as per the total of the Abstract of Vouchers

MANAGER'S REPORT OF SALES, B	ECEIPTS AND REMIT	TANCES
Store for week		191
SALES		11
Coupon Sales		
Ind. and Co.'s Sales		
Cash Sales, per Registers		
Total		
RECEIPTS		
Cash on Hand		
From Coupon Sales		
" Ind. and Co.'s "Coupons"		
" "Cash"		
" Cash Sales, per Registers		
Over or Short		
Total		
REMITTANCES		
Acc't Coupon Sales Sent to Auditor		
" Ind. and Co.'s "Coupons" Sent to Auditor		
" "Cash" Sent to Treasurer		
" Cash Sales " "		
Balance on Hand at Store		
Total		
Original to Auditor with Coupon Remittance Duplicate to Treasurer with Cash Remittance	Detail of Balance	
Triplicate to Manager Correct:	Gold	
	Silver	11
Store Manager	Currency	
Compare above figures with exhibit and see that they agree. Store managers will retain		
impression copy of this report.	TOTAL	

Fig. 197.—Form 51.

when the Vouchers are paid this account is charged and the Treasurer is credited.

- 10. Pay-roll.—The store Pay-rolls are made up in the same manner as the mine Pay-rolls and are forwarded to the Treasurer for payment. Payment is made by checks and the Pay-roll account charged, the Treasurer being credited. The Pay-roll distribution is charged to expense account.
- 11. Coupons, Books and Stationery.—This account is charged with all coupon books purchased by the company, also with all store stationery bought. As coupons are issued they are charged to Individuals and

From 211. C.P.Co. 5-23-11-1000	3-11-1000			'ASA'	ICH	STOR	WASATCH STORE COMPANY	MPA	Ϋ́					,	
To the Auditor:  Below please find Coupon Stock Report for Month of	find Cour	on Stock	Report f	for Month of	of				191	191				TAT	
Denominations—	\$1.00	8	<b>6</b> 2.00	8	8	\$3.00	\$5.00	8	\$10.00	8	\$20.00	8	<b>~</b>	Amounts	
	N 8	Books	Nos.	Books	Nos.	Books	Nos.	Books	Nos.	Books	Nos.	Books	Ω	Dollars	ş
Balance from previous month															
Received Commencing No. Closing No.													- -		
Total				'									·  <u> </u>		
Sold Commencing No															
Balance on hand Commencing No Last No. on Hand															
Totals													<del> -</del>		
Remarks:															
This report to be made at the close of each month and sent to the Auditor. Duplicate to the Manager at Salt Lake City.  Correct,	ade at the	close of	each mon	th and se	nt to the	Auditor. Correct,	Duplics t,	te to the	Manager	at Salt 1	Lake City.				i
			-191												

FIG. 198.—FORM 52.

Companies A/C and credited to this account. The mining company collects through the Pay-roll for coupon books issued by the store company, and at the end of the month when these collections are forwarded to the store Treasurer, he reports the same to the Auditor, who makes a journal entry charging Treasurer and crediting Individuals and Companies A/C. Stationery is charged out to Expense account as used.

Coupon Report.—At the end of each month a Coupon Report is made out in triplicate on form 52 (Fig. 198) at each store. The disposition of these reports is stated on the forms. This report shows the coupons on hand the first of the month, amount received during the month, amount sold during the month, and balance on hand at the close of the month.

12. Coupons Outstanding.—The company issues coupons in book form to facilitate trading at the company's stores. When coupon books are issued to employees, an entry is made in a Coupon Register for this purpose, listing the name, Check number, House number, Coupon numbers and the value of the same. Employee's receipt for the coupons they receive opposite the entry in the register. All the amounts due the company for coupons issued are collected on the mine Pay-rolls. Coupons redeemed by the store company are remitted to the Auditor weekly.

On the general books in the Auditor's office, an entry is made each month charging Individuals and Companies, Coupon account, and Crediting Coupons Outstanding, with the total amount of Coupons issued during the month. An entry is also made charging Coupons Outstanding and crediting Merchandise Sales with the total amount of coupons taken in by the store, and remitted during the month to the Auditor.

- 13. Taxes.—The store company taxes are handled in the same way as those of the mining company, being pro-rated out one-twelfth each month to expense account.
- 14. Insurance.—The insurance account is handled in the same manner as the mining company handles theirs, being pro-rated out to Expense account one-twelfth each month.
- 15. Depreciation.—This account is credited with the various amounts charged off each month to Expense account, for the Depreciation of the Store buildings, Fixtures and Furniture, and Teams and Wagons. The rate of Depreciation is figured at 10 per cent. a year and the amount is pro-rated to Expense account one-twelfth each month.
- 16. Individuals and Companies.—This account represents the total Charged sales and is credited with total amounts paid on account each month.
- 17. Profit and Loss.—All operating and Income accounts are closed into this account at the end of each year.

A monthly Financial Statement is made up by the Auditor covering the operations of the company, of which the following is a copy.

# WASATCH STORE COMPANY

Exhibit.	. <b> </b>		
	INCOME	ACCOUNT	
For the	month of		
	Gross earnings		
	Expenses		,
	Total net earnings from store		
ADD-	Vouchers, Discounts, etc.		
	TOTAL INCOME		
DEDUC	T—Taxes		
	Insurance		
	Depreciation		
	TOTAL NET INCOME		• • • • • • • • • • • • • • • • • • • •
	INCOME	ACCOUNT	
Fiscal ye	ear to date		
•	Gross earnings		• • • • • • • • • • • • • • •
	Expenses		
	Total net earnings from stores		
ADD, V	ouchers, Discounts, etc.		
•	TOTAL INCOME		
DE	DUCT—Taxes		
	Insurance		
	Depreciation		
ADD, A	ctual earnings in excess of estimat	ed earnings	
•	for six months ended	. 88	
	disclosed by inventory		
LESS, D	ividend Nodeclared and pa	aid in	
	NET INCOME		
	PROFIT AND I	OSS ACCOUNT	
By balar	ace at credit of Profit and Loss acc	count	
_,	Income as above		
	To dividend No		
	Balance		
By balar	ice to credit of Profit and Loss acc	count	
	BALANCI	E SHEET	
Current A			
	Fire Insurance (not charged out)		
	Coupon books and Stationery		
	Due from Indvs. and Companies		
	Coupons sold mine employees		
	Due from Bills Collectable		·
	Due from Utah Fuel Co.		
	Cash on hand at stores		
	Cash in hands of Treasurer		
18			

# AMERICAN MINE ACCOUNTING

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Profit and Loss

### CURRENT LIABILITIES Vouchers Pay-rolls Coupons Outstanding General Accounts Merchandise Store Fixtures Teams and Wagons Buildings ...... Less depreciation . . . . . . . . . . . . . . . . . . . Capital Stock Deferred Accounts Unpaid Taxes

.....

# CHAPTER V

### MINING AND MILLING GOLD ORE

## ACCOUNTING METHODS OF THE PORTLAND GOLD MINING COMPANY

In the Cripple Creek District of Colorado, the Gold bearing ores, which are tellurides, occur in a system of veins and irregular replacement ore bodies. The veins have an almost vertical dip and are generally narrow.

The development of these Gold deposits is by vertical shafts, levels being run from the shafts at regular distances. The vein rock is broken down in the stopes with Air Drills, it is then loaded into tram cars, and trammed to the shaft, where the cars are run onto a cage and hoisted to surface. At surface the cars go directly into the Ore Houses and are dumped, all the ore is screened, the coarse ore being washed and hand sorted before shipment. First class ore is shipped direct to the smelter, the other ore is sold to the company's mills the same as if it was going to a custom mill, a regular treatment charge being made.

Ore when received at the mill goes first to the crushers and then to the concentrating tables. From the tables the concentrates go to the Barrel House and are diverted into tube mills and slimed with a cyanide solution, the pulp passes to several filter presses for filtering. The rich gold solution from these presses is precipitated on zinc dust.

The resulting precipitates and concentrates are reduced to bullion.

The Portland Gold Mining Company operates two mills, one at the mine and one at Colorado Springs, Colo. In their method of accounting, each mill and the mine are independent.

Books of account are not kept at either mine or mills except a "Petty Cash" Book, but bookkeeping is done at the Head Office.

The accounts for the Victor Mill only are shown.

THE COST OF GOLD AT THE MINT

	Loss and Gain	a I							
Administration Salaries Insurance Taxes	Smelting Freight	Gold	Stoping Development Milling Permanent Equipt.	quipt.	Administration		Gold at Smelter	<u>4</u>	Profit on Sales
Legal Expense Miscellaneous Office Expense					Smelting		Concentrates at Mill	Frei	Freight Concentrates
				Freight Ore	<b>₹</b>   <b>&amp;</b>	Ore at Mine	Freight Ore	Milli Con Con Con Class Tub De-r Prece Filte Filte Bold Talli Con	Milling  Coarse Crushing Conveying and Sampling Fine Crushing Concentrating Concentrating Classifying Tube Milling De-watering Agitating Melting Melting Filtering Solution Tailings Expense Assaying Expense Concentrates
		Development	ment						Stoping
Drifts Breaking Tramming	Crosscuts Breaking Tramming	Raises and Breaking Tramming	Raises and Winses Breaking Tramming	Shaft No. 1 Breaking Tramming		Shaft No. 2 Breaking Tramming	Shaft No. 3 Breaking Tramming	(456	Breaking Tramming Timbering
Hoisting Bort. and Load. Other Expense	Hoisting Sort. and Load.	Hoisting Sorting and Lo	Hoisting and Loading Other Expense	Hoisting and Loading Other Francese	Loading	Hoisting Sorting and Loading Other Expense			Hoisting Sorting and Loading Other Expense
Norg.—Debit	t accounts are under	rlined, items	appearing bek	ow them may	be either a	secounts are underlined, items appearing below them may be either sub-accounts or direct charges	ot charges.	,	

## HEAD OFFICE-LEDGER ACCOUNTS

General accounts	Sub-accounts
Capital Stock	
Securities	
Property	
Cash	
Vouchers Payable	
Accounts Receivable	
	Buildings
	Machinery
	Headworks
Permanent Equipment	Cars and Rails
••••••	Pipe Lines
	Tools and Appliances
	Stable Account
	Office Appliances
Loss and Gain	
Dividends	1,
	Breaking Ore
	Tramming
	Timbering
	Hoisting
	Sorting and Loading
Mining Expense	.   { Pumping
	Lighting
	Assaying and Sampling
	Surveying
	Repairs
	General Expense
Furniture and Fixtures	•
Drainage Tunnel	4
	Coarse Crushing
	Conveying and Sampling
	Fine Crushing
	Concentrating
	Classifying
	Tube Milling
	De-watering
Victor Mill	Agitating
	Precipitating
	Melting
	Filtering
	Solution
	Tailings Expense
	Assaying Expense
	Bullion Expense
	Concentrates

HEAD OFFICE-LEDGER ACCOUNTS General accounts Sub-accounts Portland Mill Gold Account Pay-roll Supplies Litigation Unclaimed Wages Unclaimed Dividends Officers' Salaries Insurance Taxes Legal Expense General Expense.. Miscellaneous Salaries Rents Stationery and Printing General Expense

Capital Stock.—To this account is credited the amount of the Capital Stock of the company (par value). The debit for this journal entry might have been to "Subscription," "Treasury Stock" and (or) "Property," depending entirely upon the way the property was originally purchased and the disposition of the stock at the time the company was organized.

Securities.—This account is charged with all investments in the stocks or bonds of other corporations, and will be credited with the proceeds of the sale of such securities.

Property.—This account is charged with the original cost of the mining property, also the cost of additional lands purchased.

Cash.—This account is handled in the usual manner, showing the receipts, disbursements and balance on hand each month.

Vouchers Payable.—This account is credited with the footing of the Voucher Register for the month and is debited with all Vouchers paid during the month as per Cash Book.

Accounts Receivable.—This account shows the amount due the company in the aggregate. Separate accounts are kept with each individual or corporation with whom an account is opened.

Loss and Gain.—The following accounts are charged into this account each month by journal entry:

Mining Expense Victor Mill Portland Mill General Expense Gold. When the surplus credits of this account are of such proportions as to warrant the Directors in declaring Dividends, the amount so declared is debited to this account and credited to the "Dividend" account.

Dividends.—This account is charged with all dividends declared by the company and paid to stockholders.

Permanent Equipment.—This account is charged with all Plant Account expense each month as per Superintendents' reports. The folowing sub-accounts are carried for the mine:

Buildings Pipe Lines

MachineryTools and AppliancesHeadworkStable AccountCars and RailsOffice Appliances.

Accounts are also carried for each mill.

Mining Expense.—This account is charged with Stoping and Development expense as shown by the Mine Agent's report each month. The following sub-accounts are carried:

Breaking Ore Lighting

Tramming Assaying and Sampling

Timbering Surveying Hoisting Repairs

Sorting and Loading General Expense.

Pumping

Furniture and Fixtures.—This account is charged with all office furniture including desks, tables, chairs, typewriters, adding machines, check perforators, etc.

Drainage Tunnel.—This account is charged with all payments made on account of the construction of the Deep Drainage Tunnel which will furnish permanent drainage for the mine below the present working levels.

Victor Mill.—This account is charged with all milling expenses each month as per reports of the Mill Superintendents. The following subaccounts are carried:

Coarse Crushing Precipitating Conveying and Sampling Melting Fine Crushing Filtering Concentrating Solution Tailings Expense Classifying Tube Milling Assaying Expense De-watering **Bullion Expense** Agitating Concentrates Expense.

Portland Mill.—This account is handled the same as the above.

Gold Account.—This account is intended to cover the income received from the sale of all product of the mine and mills, and represents the earnings of the company from production.

Pay-roll.—This account is credited with the amount of the pay-rolls as forwarded from the mine and mills and charged to their accounts;

when the checks are drawn for these amounts the total sums are charged to this account from the Cash Book.

Supplies.—All supplies for the mines and mills are charged to this account through the Voucher Register, and credit is given this account for all supplies used by the mine and mills as per the monthly Cost Sheets.

Litigation.—The expenses of all litigation goes into this account, and an estimated monthly proportion is charged out each month to Legal Expense.

Unclaimed Wages.—This account is credited with all unclaimed wages of workmen which have not been called for during a period of six months.

Unclaimed Dividends.—This account is credited with all dividends remaining unclaimed for a period of six months.

General Expense.—This account comprises the following sub-accounts:
Officers' Salaries.—This account is intended to cover the salaries of corporation officers only.

Insurance.—This account is charged with a monthly proportion of the insurance premiums falling due in the year. The credit for this charge is to the "Insurance Suspense" account.

Taxes.—This account is charged with a monthly proportion of the Taxes for the year. The credit for this charge is to the "Taxes Suspense" account.

Legal Expense.—This account is charged with all Counsels' fees, Legal retainers, and all expenses incident to any litigation of the company.

Miscellaneous.—This account is intended to cover Directors' fees, traveling expenses, and all expenses not covered by the above accounts.

Office Expenses.—This account is intended to cover all expenses of the General Office itself, and is shown under the following sub-divisions.

Salaries.—To cover office help.

Rent.—To cover the rent of the General Office.

Stationery and Printing.—To cover all books, stationery, printed matter of all kinds and postage.

Miscellaneous.—To cover all General Office expenses not covered by the above, such as Telephone, light, general supplies, etc.

In the annual report to stockholders a Financial Statement is shown as follows:

#### SECRETARY AND TREASURER'S REPORT

Operation for 1911

Gross value of Ore mined and shipped	• • • • • • • • • • • • • • • • • • • •
Gross values recovered by New Mill	********
Net cost of Mining and Milling	• • • • • • • • • • • • • • • • • • • •
Gross profit on operations	•••••
	**********************

# Operation Continued

Gross profit as above			• • • • • • • • • • • • •
Interest Discount and Exchange			• • • • • • • • • • • • • • • • • • • •
Revenue from other sources			
Net profit on operation of mine and	l mills	• • • • • • • • • • • • • • • • • • • •	
Surplus or Prof	St and Lose Sta	towart for 1011	
_	e una 2000 Da	ichem jor 1011	
Balance January 1, 1911			• • • • • • • • • • • • • • • • • • • •
Net profit as above			• • • • • • • • • • • •
Sundry losses on railroad claims		• • • • • • • • • • • • • • • • • • • •	
Dividends paid			
Depreciation:			
Value in place of ore mined	• • • • • • • • • •		
Mine Property	• • • • • • • • • • • • • • • • • • • •		
Mill property	• • • • • • • • • • • • • • • • • • • •		
New mill property	• • • • • • • • • •		
Permanent Equipment	• • • • • • • • • •		
Office Furniture and Fixtures	• • • • • • • • • • • • • • • • • • • •		
Railroad Rolling stock	• • • • • • • • • •		
Drainage tunnel	• • • • • • • • • • •		
Balance to 1912 account		• • • • • • • • • • • • • • • • • • • •	
		• • • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·
Cash Receipts	and Disburser	nents for 1911	
Balance January 1, 1911			
From operation of mine and mills			
Bills Receivable			
Sale of Junk and Revenue from all	other sources		
Vouchers and Pay checks		•	
Dividends paid			
Balance January 1, 1911			
• •			
Balance	Sheet, January		
Cash on hand and in the bank			
Ore on hand at the mill			
Bills and Accounts Receivable			
Store and Supplies at mine and mil	ls		
Property account:			
Mine			
Mill			
New Mill			
21017 2222			
Permanent Equipment			
Railroad Rolling Stock			•
Securities			
Furniture and Fixtures			
Drainage Tunnel			
Litigation and Engineering Suspens	<b>L</b> A		
Insurance Prepaid	~		
Tunning Tichera			

Unclaimed Wages
Unclaimed Dividends
Unearned Treatment Charges
Capital Stock
Surplus, or Profit and Loss

## MINE ACCOUNTS—MINE BOOKS

General Accounts	Sub-accounts	Distributed Accounts
Stoping	Breaking Ore Tramming Timbering Hoisting Sorting and Loading Other Expense	Carpenter shop and Surface Blacksmith Shop Machine Shop Boiler Room Compressing Machine Drills Auxiliary Hoists
Development	Drifts Crosscuts Raises and Winzes Shaft No. 1 Shaft No. 2 Shaft No. 3	Hoisting Electric Plant Waste Haulage Ore House Tramming Timbering
Milling	Portland Mill   Freight   Tramming to Victor Mill   Buildings	Fuel Lumber and Timber Explosives Supplies Pumping
Plant Account	Machinery Headwork Cars and Rails Pipe Lines Tools and Aplliances Stable Account	Lighting Assaying and Sampling Surveying Repairs General Expense Office Expense Victor Mill Account
Cash Vouchers Payable Accounts Receivable Pay-roll	Office Fixtures	Victor Mill Account
Supplies	Storehouse Explosives Lumber and Timber Fuel	
Insurance Hospital		

Stoping.—This account is made up of the following sub-accounts:

**Breaking Ore** 

Hoisting

Tramming Timbering Sorting and Loading Other Expense

Distribution Sheets.—For each mine opening, both stopes and in development work, that is active during the month, one of these sheets is made out, Fig. 199 Form No. 6. The information called for on these sheets is taken from the "Machine Men's Reports" (form 2), the "Trammer's Reports" (form 13), and the "Shift Reports" (form 4). Additional information which is not furnished on the above reports is taken from the books.

The total amount of the Stoping account on the ledger for the month, is equaled by the sum of the totals taken from the Stope Distribution Sheets for the same period. In the same way the Development account is equaled by the sum of the totals from the Development Distribution Sheets.

Development.—This account is made up of the following sub-accounts:

Drifts Crosscuts Raises and Winzes Shaft No. 1 Shaft No. 2 Shaft No. 3

Milling.—This account is made up of the following sub-accounts:

Portland Mill

Freight

Tramming to Victor Mill

Plant Account.—This account is made up of the following sub-accounts:

Buildings

Pipe Lines

Machinery Headwork Cars and Rails Tools and Appliances
Stable Account
Office Fixtures

Cash.—Only a "Petty Cash" book is kept at the mine office.

Vouchers Payable.—This account is credited with the footing of the Voucher Register for the month and is charged with vouchers paid for the month as per the Cash book.

Pay-roll.—This account is credited with the gross earnings of labor for the month as shown by the Pay-roll and is charged with the Pay-roll account paid as shown by the Cash book each month.

Accounts Receivable.—This account comprises the total amount due the company as per the individual accounts on the ledger.

Insurance.—This account covers deductions made from the gross earnings of employees, on account of workmen's collective insurance.

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SHIFTS CONT				
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	COST	PRODUCTION	78	REMARKS
	Total Labor	Tons Produced	Average,	\$ per ton
	Machine Drill Cost, \$ per shift	Cost Per Ton		
	Tramming o per ton	Cost Per Ton, Ore Only		
		No. Cuble Pest Stoped		
	¥	Cost Per Cuble Foot		
	Holating e per ton	No. Linear Feet Driven		
	Lieu	Cost Per Linear Foot		
Plys and Trestmen	General Expense	No. Shifts Worked		
		No. Feet Per Shift		
Timber Relpers		Explosites, Cart Per Ton		
		Breaking, Cost Per Ton		
TOTAL	TOTAL	Timbering, Cost Per Ton		

16. 199.—FORM 6.

These deductions are 2 per cent. of the gross earnings in the case of underground men, and 11/2 per cent. for surface men. The compensation for this deduction is one-half pay for disability from accident; special indemnity being provided for fatal or more serious accidents.

Hospital.—This account covers deductions made from the gross earnings of employees on account of "Hospital Insurance." Each employee is charged one dollar for each calendar month, receiving in compensation therefor surgical and medical attention in all cases of sickness or accident, together with hospital accommodations whenever necessary.

Supplies.—This account is made up of the following sub-divisions:

Storehouse Lumber and Timber

Explosives Fuel.

### MINE-SUB-ACCOUNTS

Breaking Ore.—This account is made up of the following charges:

Machine men and helpers, labor Explosives

Hand mine, labor Machine Drills, proportion

Miners supplies

This account is closed into Stoping each month.

Tramming.—This account is made up of the following charges:

Trammers, labor

Tramming (Distributed Account)—proportion

This account closed into Stoping and Development accounts each month on a tonnage trammed basis.

Timbering.—This account is made up of the following charges:

Timbermen and Helpers, labor

Lumber and Timber

Timbering (Distributed Account)—proportion

This account is closed out each month to Stoping and Development accounts on a basis of cost of work done.

Hoisting.—This account is made up of the following charges:

Engineers, labor Skip Tenders, labor
Oilers, labor Boiler Room for steam

Topmen, labor Supplies

Cagers, labor Repairs to Building and Equipt

This account closed out each month to Stoping and Development accounts on a basis of tons hoisted.

Sorting and Loading.—This account is made up of the following charges:

Sorting ore, labor Loading ore, labor

Tramming waste, labor
Washing Ore, labor

Supplies

Repairs

Boiler Room for steam

Repairs to Ore Houses and Equipt.

This account closes into Stoping each month.

Other Expense.—This account is made up of the following accounts:

Pumping

Lighting
Assaying and Sampling

General Expense Office Expense.

Surveying

This account closes out into Stoping and Development accounts each month on a basis of tons trammed.

Drifts.—This account is made up of the following charges:

Miners and Helpers, labor Hand miners, labor Miners' supplies

Explosives

Machine Drills, proportion

Tramming, proportion Hoisting, proportion Timbering, proportion Other Expense, proportion.

This account closes out into Development account each month.

Cross-cuts.—This account is similar to the above.

Raises and Winzes.—This account is similar to the above.

Shaft No. 1.—This account is similar to the above.

Shaft No. 2.—This account is similar to the above.

Shaft No. 3.—This account is similar to the above.

Portland Mill.—This account consists of an arbitrary treatment charge assessed against the mine by the mills, for the reduction of the ores produced by the mine. The charge is based upon the assay value of each lot of ore, each day's shipment constituting a lot. The scale of charges follows the prevailing rates charged by the custom mills and smelters.

Freight.—This account is charged with the freight paid on shipments of ore to the Colorado Springs mill. It is distinct from the freight charges on supplies shipped in, which charges are debited directly to the supply accounts.

Victor Mill Tramming.—This account is charged with the labor of motorman and a proportion of the Electric Plant for power, and covers the cost of running a 5-ton motor car between the mine and the Victor mill.

Buildings.—This account is charged with all labor, supplies and other expenses incident to the construction of all buildings of a permanent nature. In making charges against this account, the particular building affected is specified so that the charge will go against the proper account.

This account closes into Plant Account each month.

Machinery.—This account is charged with the first cost of all machinery plus the freight on the same, and all labor and supplies incident to the erection of the same. In making charges to this account the particular piece of machinery of the plant affected is specified so that the charges will go against the proper accounts.

This account closes into Plant Account each month.

Headworks.—This account is charged with all labor and supplies incident to the erection of the Headworks at each shaft, including sheaves, etc. In making charges to this account the shaft affected is specified so that the cost of the different Headworks can be kept separate.

This account is closed into the Plant Account each month.

Cars and Rails.—This account is charged with the first cost of all Tram Cars, Motor Cars, and Rails.

This account is closed into Plant Account each month.

Pipe Lines.—This account is charged with all labor, supplies, etc., for the building of all water, air and steam lines. In making charges against this account the kind of a line being worked on is specified, in order to keep separate account of each kind of work. This account is closed into the Plant Account each month.

Tools and Appliances.—This account is charged with all hand tools and portable equipment used at the mine, such as Compressed Air Drills, Machine Shop Tools, Wood-working Machinery, Drill-sharpening Machines, etc.

This account is closed into the Plant Account each month.

Stable Account.—This account is charged with the first cost of all live stock, wagons, buggies, harness, automobiles, motor trucks, etc.

This account is closed into the Plant Account each month.

Office Fixtures.—This account is charged with the first cost of all typewriters, adding machines, check perforators, etc., also the office furniture, and fixtures.

This account is closed into the Plant Account each month.

Storehouse.—This account is charged with all supplies bought that are not Explosives, lumber and Timber or fuel. Supplies used are credited at the end of the month.

Explosives.—This account is charged with all explosives bought and at the end of the month are credited with all explosives used.

Lumber and Timber.—This account is charged with all lumber and timber bought and at the end of each month is credited with the amount used.

Fuel.—This account is charged with all the fuel bought and at the end of the month receives credit for the quantity used.

#### MINE—DISTRIBUTED ACCOUNTS

Carpenter Shop and Surface.—This account is charged with the following:

Carpenter Foreman, salary

Electric Plant for power

Carpenters, labor

Surface expense

Supplies

Repairs to Building and Equipt.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Blacksmith Shop.—This account is charged with the following:

Blacksmiths and helpers, labor

Supplies

Repairs to Building and Equipt.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Machine Shop.—This account is charged with the following:

Master Mechanic, salary

Electric Plant for power

Machinists and helpers, labor

Repairs to Building and Equipt.

Supplies

This account is closed out each month on a basis of labor performed to the various accounts benefited.

Boiler Room.—This account is charged with the following:

Firemen, labor

Water (paid by voucher)

Fuel

Repairs to Building and Equipt.

Supplies

This account is closed out each month on a basis of steam used. Each engine is equipped with a revolution counter, and the Master Mechanic furnishes the clerk with a distribution of the steam used; figured from the size of the engines and the revolutions made during the month.

Compressing.—This account is charged with the following:

Engineers, labor Supplies

Boiler Room for steam

Repairs to Buildings and Equipt.

This account is closed out each month on a basis of Air used, it generally goes entirely to the Machine Drill account.

Machine Drills.—This account is charged with the following:

Repairs to Drill Machines Sharpening Steel, etc. Compressor for air used.

This account closes out into Stoping and Development sub-accounts each month on a basis of Drill Shifts worked by the machines.

Machine Man's Report.—Each machine drill miner makes out one of

these reports for the shift he works, Fig 200, form No. 2. These reports show the place working and give a complete record of the progress of drilling, steel received and dulled, explosives received and used, a distribution of their working time, notes on any breakages, also complaints.

These reports go to the Mine Foreman, and are later turned over to the Mine Office.

Air Line Poor Steel Air Pressure Poor Machine No Timbers Missed Holes REMARKS:	Form M 2 2-24-12—25M	
MACHINE MAN'S REPORT  Shaft No	The Portland Gold Mining Co.	
Shaft No		
Place Kind and Size of Drill Used Number of Holes Number of Drills Received Number of Drills Received Number of Drills Dulled Powder Received Powder Used Sticks Number Ft. Fuse Received Number Ft. Fuse Used Time Actual Drilling Hours Mucking Hours Barring Down Breakage: Machine Drills Timbers COMPLAINTS: Air Line Poor Steel Air Pressure Poor Machine No Timbers Missed Holes REMARKS:  Date  Name	MACHINE MAN'S REPORT	
Place Kind and Size of Drill Used Number of Holes Number of Drills Received Number of Drills Received Number of Drills Dulled Powder Received Powder Used Sticks Number Ft. Fuse Received Number Ft. Fuse Used Time Actual Drilling Hours Mucking Hours Barring Down Breakage: Machine Drills Timbers COMPLAINTS: Air Line Poor Steel Air Pressure Poor Machine No Timbers Missed Holes REMARKS:  Date  Name	Sheft No.	
Number of Holes Total Feet Drilled Number of Drills Received Number of Drills Dulled Powder Received Sticks Powder Used Sticks Number Ft. Fuse Received Number Ft. Fuse Used Time Actual Drilling Hours Mucking Hours Barring Down Hours BREAKAGE: Machine Drills Timbers COMPLAINTS: Air Line Poor Steel Air Pressure Poor Machine No Timbers No Timbers No Timbers REMARKS: No Timbers No Timbers REMARKS:		
Number of Holes Total Feet Drilled Number of Drills Received Number of Drills Dulled Powder Received Sticks Powder Used Sticks Number Ft. Fuse Received Number Ft. Fuse Used Time Actual Drilling Hours Mucking Hours Barring Down Hours BREAKAGE: Machine Drills Timbers COMPLAINTS: Air Line Poor Steel Air Pressure Poor Machine No Timbers No Timbers No Timbers REMARKS: No Timbers No Timbers REMARKS:	Kind and Size of Drill Used	
Number of Drills Dulled		
Powder   Received	Number of Drills Received	
Powder Used Sticks Number Ft. Fuse Received Number Ft. Fuse Used Time Actual Drilling Hours Mucking Hours Barring Down Hours Breakage: Machine Drills Timbers Complaints: Air Line Poor Steel Air Pressure Poor Machine No Timbers No Timbers Missed Holes REMARES: DATE NAME	Number of Drills Dulled	
Number Ft. Fuse Received Number Ft. Fuse Used Time Actual Drilling Hours Mucking Hours Barring Down Hours Breakage: Machine Timbers Complaints: Air Line Poor Steel Air Pressure Poor Machine No Timbers Missed Holes REMARES:	Powder Received	Sticks
Number	Powder Used	Sticks
Time Actual Drilling	NumberFt. Fuse Received	
Mucking Hours Barring Down Hours BREAKAGE:  Machine Drills Timbers  Complaints: Air Line Poor Steel Air Pressure Poor Machine No Timbers Missed Holes  REMARKS:  DATE  NAME	NumberFt. Fuse Used	
Barring Down Hours BREAKAGE:  Machine Drills Timbers  COMPLAINTS: Air Line Poor Steel Air Pressure Poor Machine No Timbers Missed Holes  REMARKS:  DATE  NAME	Time Actual Drilling	Hours
BREAKAGE:  Machine  Drills  Timbers  COMPLAINTS:  Air Line  Poor Steel  Air Pressure  Poor Machine  No Timbers  Missed Holes  REMARES:  DATE  NAME		
Machine	Barring Down	Hours
Drills		
Timbers		
COMPLAINTS: Air Line		
Air Line Poor Steel Poor Steel Air Pressure Poor Machine No Timbers Missed Holes  REMARKS:  DATE NAME	Timbers	
Poor Steel	Complaints:	
Air Pressure		
Poor Machine		
No Timbers Missed Holes  REMARES:  DATE  NAME		
Missed Holes  Remarks:  Date  Name		
Remarks:  Date————  Name	210 04440	
DATE		
Date		
	DATE	•••••••••••••••••••••••••••••••••••••••
Machine Man.	Name	
	1	Machine Man.

Fig. 200.—Form 2.

The information contained in these reports is posted daily to the Distribution Sheets for the various underground openings affected.

Auxiliary Hoists.—This account is charged with the following:

Engineers, labor Cagers, labor Supplies
Boiler Room for steam.

As these "Dinkeys" or third compartment hoists are used principally for lowering timber, and handling steel both in and out of the mine, the account generally closes out to "Timbering" and "Machine Drills."

# Hoisting.—This account is charged with the following:

Engineers, labor Oilers, labor Topmen, labor Cagers, labor Skip Tenders, labor Boiler Room for steam Supplies

Shaft Repairs

Repairs to Building and Equipt.

In making charges to this account the following sub-divisions are made, Hoisting, Top Tramming, and Shaft Repairs.

This account is closed out each month to Stoping and Development accounts on a basis of tons hoisted.

Hoist Report.—The Top man at each shaft makes out for each shift a Hoist Report, Fig. 201, form No. 23. These reports show the material hoisted and the grade, also the levels from which it comes. These reports and the Trammer's Reports for the same shaft and shift must check.

	_O'Clock		. 0141,	J			191
Level No.	Cars of Ore	Cars of Mill Dirt	Cars of Waste	Water		Cars Waste Dumped in Old Stopes	Remark
Tunnel,							
200							
400							
1000							
1200							
Totals					_ ;		

Fig. 201.—Form 23.

## Electric Plant.—This account is charged with the following:

Machine Shop—Labor of electrician; repairs to plant Electric Power—commercial; (paid by voucher) Supplies—lamp renewals, transmission lines, repairs.

Account is closed out each month into accounts using electric power, such as Carpenter Shop, Machine Shop, Haulage System, and Lighting.

The basis of the distribution into these accounts is shown by watt-meter readings.

Waste Haulage System.—This account is charged with the following:

Haulage engineers, labor
Electric Plant for power
Repairs to tracks and equipt.
Operation and maintenance of Elevators and Belt Conveyors.

The following sub-divisions are shown for this account.

Motor cars
Elevators
Belt Conveyors.

This account out each month into "Ore Houses" (Tramming Waste).

Ore Houses.—This account is charged with the following:

Sorting Ore, labor

Boiler Room for steam

Loading Ore, labor

Supplies

Washing Ore, labor

Tramming Waste (Waste Haulage

System).

The following sub-divisions are shown for this account:

Sorting Loading Tramming Waste

Washing.

This account is closed out each month into "Sorting and Loading" a sub-account of Stoping.

Tramming.—This account is charged with the following:

Supplies Tram car repairs Track Repairs.

This account closes out each month into "Tramming" a sub-account of Stoping.

Trammers' Tags.—Each trammer fills out and places on each car that he sends up a tag, Fig. 202. form No. 13. This tag shows the grade of material in the car, where it was trammed from, where to and whether it was taken from a chute, plat or rough bottom. When the men are tramming waste for filling in old stopes, they make out one tag for the rock trammed from and to the same places, if they are changed about to different places they make out separate tags to cover the different places. When trammers are doing other work than tramming they must state so on a tag showing what they are doing and the time in hours for each job.

	19
Mill Dirt	Waste
d Run to-	
Taken from	
Platt	Rough Bottom
	Tramme
	Mill Dirt  d Run to  Taken from

Fig. 202.—Form 13.

All these Trammers' Tags are taken up by the Cagers at the different shafts when the cars are dumped, at the end of the shift they are turned into the office, sorted out and counted, the count being entered on the Distribution Sheets for the various underground openings effected.

Timbering.—This account is charged with the following:

Supplies
Delivering timber
Auxiliary Hoists, proportion.

This account is closed out each month to "Timbering" a sub-account of Stoping.

Timberman's Report.—The Timbermen make out each shift a report, Fig. 203, form No. 12, for each place timbered during the shift showing the place and material used in detail.

These reports go to the Head Timberman who makes out for each place timbered during the month, a Timber Report, Fig. 204, form No. 24. The details of the daily reports are posted to these Timber Reports, showing for each day worked, the kinds and quantities of material used on the different jobs.

These reports go to the Supply Clerk at the end of the month, and have the cost of the timber entered on them.

	TIMBERMAN'S R	
		Stope or Drif
Posts	<u> </u>	
Caps		
Sills		
Ties		
But Caps		
Stulls		
New Raised		
Raised		
Sprags		
Ladders		
Planks, Ft.		

Fig. 203.—Form 12.

	1			<del></del>	<del></del> .		Mont	b of_							191_
Day	Posts	Cape	Ties	Butt Caps	Sills	Cribbing	Stulls	Lagging	Helpers	Planks-Ft.	Slabs	Wedges	Ladders	i '	
2		— - 				- <del></del>	- == 	<u> </u>	-	; - <del>-</del>	_				<u></u> -
3													_		
			_			_				_		_		_	
31	1	1		1	1	1	1		'		1				
Total				1	<u> </u>	<u>-</u>		<u> </u>	1	l	1	l			
Cost								    							

Fig. 204.—Form 24.

Fuel.—All fuel used is charged to this account. The Master Mechanic reports to the Supply Clerk the weight of coal used each month. This account is closed out to the different accounts benefited on a basis of fuel used.

Lumber and Timber.—This account is charged with all lumber, timber, poles, lagging, ties, ladders, wedges, etc.

This account is closed out each month to the various accounts benefited according to the value of the material used.

In making charges to this account, it is necessary to specify the job or place in order to make a proper distribution of the account.

Explosives.—This account is charged with all explosives used, that is, powder, caps and fuse, together with the cost of handling same.

This account is closed out each month to the various accounts benefited according to the value of the explosives used.

In making charges to this account, the particular opening to which the material goes is specified.

Ammunition Order.—Each Machine miner makes out an Ammunition Order, Fig. 205, form No. 11, for his day's supply of explosives. These orders are filled by the Powderman, the material being delivered to the proper working places.

A	MMUNITION ORI	DER
 _O'Clock Sh	nift	190
 Level.	Place Working	
Sticks 1½"	Powder.	
 _ " "	**	
 Length	s Fuse	Feet Long.
 <u> </u>	**	
 		14 44
		Machine Man.

Fig. 205.—Form 11.

The Powderman makes out a Powderman's Report, Fig. 206, form No. 3, for each opening that is active during the month. The Ammunition Orders are posted to these reports each day in detail showing the date, quantity and kind of powder, fuse and caps delivered.

These reports are turned in to the Supply Clerk at the end of each month and have the values entered on them, the information is then posted to the supply records, etc.

Level		THE	PC	FLANI OWDER	MAN'S	REPO	RT	G CO.	Form M 3	
Day	1 g" Powder lbs.	4" Powder lbs.	Powder 60% lbs.	Powder 100% lbs.	Fuse, Feet	Water Fuse, Feet	Сар	Cap Protectors		
1 2 3 4										
30_31										=======================================

Fig. 206.—Form 3.

Supplies.—This account is charged with all supplies used that are not covered by specific accounts, such as Timber and Explosives.

In making charges for supplies used the particular job must in all cases be stated, to enable the accounting clerks to make a proper distribution of the charges on the Supply Records.

This account is closed out each month to the various accounts benefited on a basis of the value of supplies used.

Pumping.—This account is charged with the following:

Pumpmen, labor Supplies Boiler Room for steam

Pump repairs.

This account closes out each month to "Other Expense," a sub-account of Stoping.

Lighting.—This account is charged with the following:

Electric Plant for light

Candles.

This account closes out each month to "Other Expense," a sub-account of Stoping.

Assaying and Sampling.—This account is charged with the following:

Assaying, labor

Electric Plant for power

Sampling, labor

Fuel

Supplies

Repairs to Building and Equipt.

This account closes out each month into "Other Expense," a sub-account of Stoping, on a tonnage basis.

This account represents the cost of taking daily samples in each of the working stopes and development places, and keeping a record of same.

All assays made are reported on blanks used for that purpose, Fig. 207, form No. 10, showing the consecutive assay number, description of the samples, contents and values.

	ples ass		gav			per to
	C	Gold	= ===		Va	due
Description	OZ.	hdth.			\$	cts
	ļ					<u> </u>
						~
	$\overline{}$		1		1	_
	ľ		1	l l	1	
	Description	Description	Description Gold	Gold Description	Description Gold	Description

Fig. 207.—Form 10.

Surveying.—This account is charged with the following:

Engineers, salary Assistants, labor Supplies.

This account closes each month into "Other Expense," a sub-account of Stoping.

Repairs.—This account is charged with the labor and supplies used in making general repairs about the mine—repairs which are not directly chargeable to the accounts mentioned above, as noted. It closes out each month into "Other Expense," a sub-account of stoping.

General Expense.—This account is charged with the following:

Superintendent's salary
Mine Foreman's salary
Shift Bosses' salary
Supplies
Boiler Room for steam heat for buildings.

This account closes out each month into "Other Expense," a sub-account of Stoping.

Office Expense.—This account is charged with the following:

Chief Clerk, salary Timekeeper, salary Supply clerk, salary

Supplies
Telephone and Telegrams.

This account closes out each month into "Other Expense," a sub-account of Stoping.

Victor Mill Account.—This account is charged with the amounts of labor performed, and supplies furnished, for the benefit of the Victor mill. It closes out each month into "Accounts Receivable."

### GENERAL STATEMENT OF ACCOUNTING

The only account books used at the mine are the

Petty Cash Book Voucher Register, and Pay-roll.

Cash Book.—All funds received by the company at the mine are entered in the Cash Book in the usual way. All cash payments are entered in the Cash Book, showing distribution. The cash book is closed each month, and the balance remitted to, or received from, the treasurer, as the case may be, in order to keep the amount of cash on hand at the mine office a constant sum.

Voucher Register.—Entry is made in this register of all vouchers chargeable to the operation of the mine, and which have the approval of the mine manager, such as salaries of foremen and heads of departments, bills for water and electric power, etc. The distribution of the vouchers into the accounts benefited is also noted on the register, whence it is entered onto the "General Office" column on the cost-sheet for proper distribution.

Engaging Labor.—All persons seeking employment with the company, apply to the head of the department they wish to work in and if they are engaged, the foreman sends them to the office, where the Timekeeper makes out for each man employed a card, Fig 208, form No. 29. These cards call for specific information which in all cases much be complete. They are filed in a card index, alphabetically arranged. When an employee severs his connection with the company his card is removed from the live file, the date and the reason for leaving is noted on the card and it is filed in another file for future reference.

Nam	16			
Age	No	Street,		Colo
Nationality	Married	Y	ears Experience	
Date Employed	191	Occupation		Wages
Last Employer				
Reason for Leaving-				
In Case of Serious Accident, Notify——				
	Address			
Insurance?	Signature		<del></del>	
Date of Leaving	191	If Discharged, By whom—		
Ressons-		Remarks_		

Fig. 208.—Form 29.

When an employee resigns or is discharged, the foreman furnishes him with a Time Check, Fig 209, form No. 9. This check is an order on the Timekeeper to pay for a stated amount of time at a stated rate of pay. These orders are not negotiable.

No	The Po	tland Gold Mining Co.
191	No.———— To The Timekeeper,	Time Check.
Shifte at \$	Portland Office:	•
Occupation		shifte at \$ in Month of
	Shifts.	NOT NEGOTIABLE.

Fig. 209. Form 9.

Upon presentation to the Timekeeper this check is compared with the Pay-roll and if correct the extension is made in the Pay-Roll, and a bank check issued in settlement of the person's account. The check number is entered in the Pay-roll; also the date of settlement.

Timekeeping.—The foremen of each department both on Surface and Underground keep the time of their men in ordinary monthly pocket time books. At the end of each shift these books are turned into the office, and the Timekeeper posts the time direct to the Pay-roll.

PAY ROLL-7	PAY BOLL-THE PORTLAND GOLD MINING COMPANY — MINE DEPARTMENT.	OLD MINING	COMPANY - MINE	DEPARTMEN	Ę.		19	Pay Roll No.	8	1
	l				The of Pa	2	DEDUCTIONS	The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa	, j	
	No. NAMES	OCCUPATION			A Day Mare		Olimba Indon' Bergital	ž	15	
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	3									
	•									
	9									
	•					_				
	22									
	8									
		Total,								
	I CERTIFY THAT THE AL IN THE BENVICE OF THE I	DVE NAMED PERSON HORTLAND GOLD MIN	I CERTIFY THAT THE ACOVE MAMED PERSONS HAVE SEEN DILIGENTLY EMPLOYED DURING THE TIME EMACIFIED IN CONTINUE OF THE FOURTH AND MACHINE AND AMOUNTS AND COMMENTED OF THAT THE COCUPATIONS, RATES AND AMOUNTS AND CONSECURATIONS, RATES AND AMOUNTS AND CONSECURATIONS, RATES AND EMPLOYED	PLOYED DURING THE TIM		APPROVED:				
			BUPERINTENDENT		MANAGER	ور				

Fig. 210.—Form 1.

In entering names in the time books the foremen classify their labor, that is, the Shift Boss will group his Machine miners, Hand miners, Trammers, etc. The same idea of classifying is carried out by other foremen.

Pay-roll.—The Pay-roll which is a loose leaf book is made up directly from the Foremen's time books, the time being posted to the Pay-rolls each day. The Pay-roll used is a combination Time book and Pay-roll, Fig. 210, form No. 1.

At the end of each month the extensions are made and the Pay-roll proved. As soon as completed it is submitted to the Superintendent for inspection and then goes to the Manager for approval.

The pay-roll is kept in duplicate, the duplicate being retained at the mine office, while the original, as soon after the first of the month as completed, is forwarded to the treasurer's office, where bank checks are drawn and forwarded to the mine office, to be issued to the employees on the tenth of the month. No receipts are required from employees, the check, properly endorsed, being considered sufficient receipt.

Distribution of Labor.—This distribution is made up from the following reports:

Carpenter Shop Report	Form No. 5
Master Mechanic's Report	Form No. 17
Blacksmith's Report	Form No. 7
Ore House Report	Form No. 14
Shift Bosses Reports	Form No. 4.

And to the above is added the office force.

The various headings as required for the different jobs are written in on the Distribution of Labor sheets, Fig. 211, form No. 8. Separate

		_				T	н	E	F	•o	R	Т	L	AI	NI	D	G	C	L	D	1	W	IN	11	N	G	C	0	M	P	A	N	Y							_		1	2_						
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	$\Box\Pi$	П	П	П	П	П	П	П	П	П	П	П	Ш		П	I	Π	П	П	П	П	П	$\Pi$	П	П	П	П	:1	Ш	П	П	П	H	đ	Ш	1	Ш	Ħ	Ш	Ħ	П	ш	П	Ш	1	Ш	tır	Тİ	_
•	Ш		11.	П	П	П	Ц	П	П		Ц	Ц	П	_		4	Ш	Ц	П	П	П	П	П	П	Ш	П	ш.	П	П	Ц	П	Ц	П		Ш		Н	П	Œ.	п	П	Ш	П	Ш	П	ш	Ш	п	=
	44	H	#	H	#	Н	₩	H	++	Н	#	Н	ш	4	ш	4	11	Н	Н.	Н	• •	Н	#	Н	+	Н	4	H	щ	н	#	Н	ш	н	Ш	4	щ	41	4	41	#	Ш	Н	щ	4	ш	Ш	П	_
-	-+++-	₩	++	н	₩.	<del>ا</del> ⊦	₩	₩	++	₩	++-	↤	₩	-1	Н	+	₩.	Н	н	Н	++	₩	#	H	₩.	Н	++	H	+++	н	н.	н	₩	Н	ш	+	₩	-#	ш.	++	₩.	₩	н	ш	4	ш.	##	++	_
-	-+++	H	++	Н	ŧŧ٠	Н	++	H	++	H	**	H	+++	+	H	+	H	н	H	₩	Ħ	t t	tt	H	++-	H	**	H	+++	Н	H	н	+++	+	+++	+	ж	++	++	₩	++-	₩	₩	+++	н	++	₩	++	_
	-+++	Ħ	#	H	H	H	#	H	Ħ	Ħ	:†:	H	*††	+	н	+	11.	H	H	H	++	H	Ħ	H	Ħ	++	#	H	tΗ	H	#	H	+++	+	ĦĦ	+	Ht	++	++-	++	++	ĦĦ	++	+++	-11	₩	##	H	_
	111	Ħ	Ħ.	ш	ш	Ħ	#	Ħ	##	ш	Ħ	u	ш	_	ш	_	Ħ.	$\Box$	<u>tt</u>	ш	Ħ	ᄇ	Ľ.	Ħ	11:	: t	!t	Ħ	Ħ	H	Ħ	H	ш	⇉	ш	_	ш	#	#	#	#	ш	ш	ш	#	ш	ш	,,	-
-	-	T	T	_	~	П	П	т	7	_	~	т	m	7		_	_	_	-	_	_	_	_	-	-	_	_	_	=	=	_	=	-	_	•	_	т	_	_	_	=	-	_		_	-		7	_
	111	11	П.	П	Ħ	П	Ħ	П	11	П	Ħ	П	ш	Т	П	╅	т	П	Ħ	t t	11	* 1	Ħ	Ħ	11	Н	**	П	111	Н	Ħ	П	ш	T	ш	7	ш	11	**	11	Ħ	111	Н	ш	71	**	111	11	_
_	111	П	т	П	П	П	Π	П	т	П	т	П	ш	Т	ш	Т	Ť	П	Ħ	П	Ħ	П	т	П	т	П	т	П	т	П	т	т	т	т	ш	Т	ш	71	т	Ħ	Ħ	ш	П	ш	71	т	т	m	
_	111	П	Ħ	П	П	Ħ	Ħ	П	т	П	Ħ	П	ш	7	ш	7	т	П	П.	П	11	П	Ħ	Ħ	m	П	#	П	ш	т	11	П	ш	т	ш	7	ш	11	*	11	11	ш	11	111	71	*	111	11	
_	-111	Ħ	#	т	Ħ	H	Ħ	Ħ	11	11	Ħ	Н	ш	7	ш	7	т	H	Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	H	11	Н	ш	H	#	H	111	Ħ	ш	+	ш	11	**	Ħ	11-	ш	Н	***	4	**	##	Н	
_		п	Ħ	п	п	п	п	П	п	П	П.	п	ш		ш		ш		1	П	п	П	П	п	ш	Ħ	Ħ	п	ш		:11	Π	ш	1	ш	_	ш	11	11	11	11	ш	п	111	71	11	ш	11	_
	ш	п	и	п	ш	ш	п	П	п	п	п		ш	_	Ξ	Н	Η	ц	ш	п	п	П	п	П	Ш	П	П	Ц	E		Ш	П	E	Н	ш	Н	Н	П	Н	п	п	ш	П	Н	Н	Н	ш	п	
-	-##	<del>1</del> †	++	Н	₩	Н	H	H	₩	н	₩.	Н	ш	-#	н	+	н	Н	н.	Н	#	Н	#	н	н	Н	++-	Н	н	н	н	н	ш	Н	ш	4	ш	-11	11	₩	н	ш	н	ш	7	-	₩	H	_
	_111.	ш	11	LL.	Ш.	ш	ш	Lı	ш	ш	ш.	ш	ш		ш	_1	ш		П.	ш	ш	11	П.	11	ш	ш	ш	ш	ш	ш	ш	ш	ш	ш	ш	_1.	ш	-11	ш	11	ш	ш	1.1	ш	ш	ш	111	11	

Fig. 211.—Form 8.

sheets are carried for the different classifications of labor. The time is posted to them daily.

The total time as shown by the distribution of any classification of labor must check with the time for that classification. The whole time for all classifications must check with the total time as shown by the Pay-roll.

The Carpenter Foreman makes out each day a Carpenter Shop Report, Fig. 212, form No. 5, giving a distribution of the labor of his men for the day. This report is turned into the mine office each evening.

The Master Mechanic makes out each day a report showing a distribution of the labor of his men for the day on Fig. 213, form No. 17.

THE	PORTLA	ND GOLD MINING COMPAN	IY .
	1	Portland, Colo.,	190
	CARI	PENTER SHOP REPORT	
SHIFTS	@	OCCUPATION	
		Carpenters in Shop	
		Sawyers in Shop	
		Sawyer Helpers in Shop	
		Carpenters on	
		Carpenters on-	
		Carpenters on	
		Carpenters on	
		Carpenters on	
		Carpenters on	
		Men Cutting Lagging	
		Men Cutting Plank	<del></del>
		Men on Cribbing at.	
		Men on Cribbing at	
		Men in Lumber Yard	
		7	
		Foreman	
	_	10181	
		<u>-'</u>	
	_		
		Carpe	nter Foreman.

Fig. 212.—Form 5.

This report which covers all men in the Master Mechanics department is sub-divided between the three shafts. This report is turned into the mine office each morning.

In order to facilitate the cost keeping methods each machinist makes out each day an individual report of his labor for the day, showing the various jobs that he has worked on and the number of hours spent on each. Fig. 214, form No. 16.

These reports are made out by the men and turned in to the Master Mechanic at the end of each shift.

The Master Mechanic condenses this information for making up his daily report. The detailed information is used in making up the cost for Shop Requisitions.

## THE PORTLAND GOLD MINING CO.

## DISTRIBUTION OF LABOR IN MACHINERY DEPARTMENT.

	No. 1	No. 2	No 8	
	SHAFT	SHAFT	SHAFT	TOTAL
MACHINERY REPAIRS AND No				
On Air Drill Repairs	<b> </b>			
Machinist on Repairs.	ı			
Machinist on New Work				
Machinists' Helpers				
Boilermakers	1			
Boilermakers' Helpers	1			
Pipe and Chain Gang	<b></b>			
Electrician				
Apprentice				
MEN ON ENGINES AND COMPRESSORS. No				
Hoisting Engine, Top				
Hoisting Engine, Underground.	}		<b></b>	ļ
Hoisting Engine, Auxiliary	ļ			
	}			
Engine Wiper		- <b></b>		
Compressor	<b></b>			ļ <b>-</b>
Waste Haulage	ļ			
Ore Loading Engine			ļ	
MEN ON BOILERS, No	l 			
Boiler Cleaner				
PUMP MEN. No				
Mine Pumps, Station	<b></b>			
	ļ			
Washer Pumpa	<del> </del> -			
Head Pumpman				
BLACKSMITH SHOP. No				
Blacksmiths			ļ	ļ
Blacksmiths' Helpers	ļ			
	ļ- <b></b>		ļ	
SPECIAL HELP.	ł			
Haulage System				
Cables	ļ <b></b>		}	
Cleaning, Sorting, etc.			·	
	<del> </del>			<del> </del>
	<del> </del> -			
Total Men	L			

Fig. 213.—Form 17.

•	Hours	Total
No. Hoist		
No.——Compressor——		_
No. Boiler Room		
Dynamo Engine		
Electric Lines		_
Waste Haulage		_
Air Drills		
Air Lines		
Steam Lines	'	_
Water Lines		
Tram Cars —		
	<u> </u>	
		_
		_

Fig. 214.—Form 16.

Shop Requisitions.—As the company makes and finishes in their own shops a large amount of the supplies used at the mine and mills, a Shop Requisition, Fig. 215, form No. 18, is used to keep detailed track of the supplies and labor that goes to make up the total cost of the job.

Each job is given a number and a Shop Requisition is made out for it. This requisition is in two parts; when the job is complete the top part is sent with the material covered, to the parties ordering the same, the lower part being turned into the office.

The Blacksmith Foreman makes out a daily report, Fig. 216, form No. 7, showing the various jobs his men have worked on and the number of hours worked on each. This report is turned into the mine office each morning.

The Ore House Foreman makes out at the end of each shift a report, Fig. 217, form No. 14, showing the classification of his labor and the time worked on the different jobs. This report also shows the cars of waste to the dump and the cars loaded for shipment. This report is turned into the office at the end of each shift.

The Shift Bosses make out at the end of each shift for each shaft a Shift Report, Fig. 218, form No. 4, showing a distribution of underground labor to the various openings in which work is being carried on. The labor is also recapitulated under the heads of Stopes, Development and General Underground.

~		PLANT		
Shop	Requisition N			191
То				
Please furnish the follow		PLAN	T	
	ing at ucles for			a1
theat the same time articles are		met of lebo	Plant. Return the	his Requisition
retain the coupon to accompa				
Material	Cost	Hrs.	Labor	Cost
		-    -		
		<u>"                                    </u>		
		-		
	'	-   -		
		  -	Total cost	<u> </u>
How delivered?	Date:	(	Correct:	
	3		PLANT	
	uisition No.—			
Material	Cost	Hrs.	Labor	Cost
<del></del>		-   -		
		_! !_		

Fig. 215.—Form 18.

	Portland	, Colo.,———————————————————————————————————
	BLACKS	MITH SHOP REPORT
HOURS	NO.	
		Blacksmiths sharpening drills.
		Hapas
		Blacksmiths repairing drills.  Helpers """
		Blacksmiths making new drills.
		Helpers " "
		Blacksmiths on general work.
		— Helpers " " "
		Blacksmiths on
		Helpers on Blacksmiths on Blacksmiths
		Helpers on
	<del></del>	Blacksmiths on
		Helpers on
		Blacksmiths on
		Helpers on

Fig. 216.—Form 7.

		Portland, Colo.,		190
		ORE HOUSE REPORT		
NO.	1.		N	o. 2.
SHIFTS	@	OCCUPATION	@	внітт
		Ore House Boss		·
		Sorters		-
		Trammers		i
		Loaders		
	i			
		Screen Men		
		Samplers		
		Men on Washers		
		Men on Elevator		_
	 	Totals		·
		Cars Waste to Dump		
		Cars Loaded		

Fig. 217.—Form 14.

SHAFT NO.							MSHI	F					
	WORE 1	DONE TH	IS SHUFT		RECAP	TULATIO	N OF WO	RK DONE	IN STOPE	M CKA &	EVELOPM	ent	_
													Γ
	LN STOPES	DEVELOPMENT	GENERAL										
OCCUPATION	B)Lifte	Shifts	BHILL	SPIC.	Shifts	ماكندة	Shifts	Shifts	SPIUS	Shifts	Shifts	SPICE.	
Machine Men													Г
Machine Helpers													
Head Miners													
Muckers													Ĺ
Stope Sweepers													L
Transmers													
Timberman													L
Timber Helpers	$\sqcup \sqcup$						$oxed{oxed}$						L
Nippers	$oxed{oxed}$		L									$\sqcup \sqcup$	L
Pipe and Track Man					$\sqcup \bot$							$\rightarrow$	L
Cugues					$oxed{oxed}$							$\sqcup \sqcup$	L
Topmen					$\sqcup \sqcup$	<b>I</b>		<u> </u>					L
Cur Gressers		<u> </u>					oxdot	igspace		$\vdash$		$\sqcup \sqcup$	L
Powdermen	$\sqcup \sqcup$	oxdot	$\sqcup$	<u> </u>	$\sqcup \!\!\! \perp$				$\sqcup \sqcup$		L	$\sqcup \sqcup$	L
Bouvengers					$\sqcup \sqcup$		$\sqcup \bot$	igsqcut	$\Box$		$oxed{oxed}$	$\Box$	L
Mud Ball Mea													L
Timber Bustlers	<del>                                      </del>						$\sqcup \bot$		$\sqcup \sqcup$		$\Box$		L
Shaftmen	$\vdash$	$\vdash$		-	$\vdash$	$\vdash$	$\sqcup \!\!\! \perp$		$\Box$	$\vdash$	$\sqcup\sqcup$	$\sqcup \sqcup$	L
Shift Boss				_		-							_
TOTAL		لــــــــــــــــــــــــــــــــــــــ		Щ.					لهلسا				_
Remarks				··				-		Date			
									1	Vame		Shift Bo	_

Fig. 218.—Form 4.

REQUISITION BLANK	1M-5-26-11
THE PORTLAND GOLD MINING COMPANY MINE DEPARTMENT	,
Victor, Colo.,	191
Please order for	
Approved:	oreke <del>e</del> per.
	ntendent.

Fig. 219.—Form 28.

These reports are turned into the mine office at the end of each shift.

Storehouse Department.—All material for the mine and mills is procured through the Purchasing Agent.

As material is required to replenish the storehouse stock or for special jobs, the Storekeeper makes out a Requisition, Fig. 219, form No. 28, in duplicate, specifying the quantity and kind of material required. These Requisitions must have the approval of the Superintendent before being forwarded to the Purchasing Agent. The original copy goes to the Purchasing Agent, and the duplicate is placed on file.

Purchase Orders.—In the purchase of supplies the Purchasing Agent issues orders numbered in triplicate; the original copy goes to the seller, the duplicate to the files, and the triplicate to the mine or mill making the Requisition.

Material Received Register.—All shipments received, both freight and express, are entered in the Register of Material Received, Fig. 220, form No. 20. This register calls for full data covering the Date received, Freight bill date and number, Consignor, Number of Packages, and an itemized list of material showing quantity, kinds and weights, Purchase order number, also the freight charges.

Invoices.—All invoices are received by the Purchasing Agent and checked as to prices, extensions and footings; they are forwarded to the mine or mill concerned.

The invoice goes to the Storekeeper, who enters the date, costs, discounts, etc., in the Register of Material Received, against the various items covered by the invoice. If the goods have not been received the invoice is held until they arrive. The invoices are then O. K.'d by the Storekeeper for receipt of material and turned over to the mine or mill clerk for Vouchering. All invoices are entered in the Voucher Register and vouchered before payment.

Stores Records.—To keep an accurate detailed record of all stores purchased and used, also to carry a perpetual inventory, a stores card index is used, Fig. 221, form No. 21.

A separate card is made out for each article, kind or size of material as required. These cards are indexed and also grouped under class heads, such as Nails, Oils, lumber, etc., to facilitate the work of the storekeeper.

All material received is posted from the Register of Material Received to these cards, showing the quantity, total cost and consignor. This work is done from day to day by the Storekeeper, following closely upon the posting of the invoices to the Register.

The Storekeeper when entering the values on the "Orders on Storekeeper," also posts to the cards the quantity, value and account chargeable for material used.

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REGISTER OF MATERIAL RECEIVED	MATERIAL RECEIVED											
<u> 원</u>	Packages Overetted	+	H	L		L	H	_	L		-	1
		+	H	L	L	L	-	L	L	H	L	H
Sign	1	L		L	L	L		L	L	L		
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	Received Freight Bill											
	4 to 0											
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		?							L	L	L	$\Omega$

rg. 220.—Form 20.

	ARTICLE										UNIT		
SIZE				BRAND					MINIMOM	AUM		CHECKED	۵
1	=	ISSUED		8	BALANCE	SE	_		=	ISSUED		BAL	BALANCE
DATE	ACCT.	ACCT. QUANTITY VALUE QUANTITY VALUE	AALUE	QUANT	F	VALUE	٥	ATE	ACCT.	QUANTITY	VALUE	DATE ACCT. QUANTITY VALUE QUANTITY	AALUE
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Fig. 221.—FORM 21.

At the end of each month after all invoices for the month have been posted and the entries made on the cards for all material received, the balance of the stores used are posted and the cards are balanced, showing in the balance column the quantity and value as of the first of the month. Once a year the cards are checked against the actual count or weight of material on hand.

Stores Used Records.—Stores are delivered only on the presentation of an "order" properly signed by some one authorized to sign such orders. These orders are posted to the Stores cards and the values entered on the orders at the same time.

HE PORTLAND GOLD MIN	ING CO.
ORDER ON STOREKEEPER	
	190
please deliver to bearer and charge to-	
	Foreman.
	ORDER ON STOREKEEPER please deliver to bearer and charge to

Fig. 222.—Form 22.

	THE PORTL	(MINE I	DEPAR?			Form M-25	10-28-10 2 <b>M</b>
			For_				_191
Quantity	Description	Cost		Total (	Cost	Charge Acc't No.	
						-	
						<del>-</del>	<del>'</del>
						-	
-						-	
		·					<u>-</u>

Fig. 223.—Form 25.

o Irving	Howbert, President, Colorado Spring			Victor,	Colorado	, <del></del>	1	
	LABOR				PRODU	CTION		
Office Account	Office Men				Оте		Cars	Tons
	Surveyors			Shaft	Mill Di	rt		
	New Building:			No. 1	Waste		_ -	
Construc-	New Machinery		)		Timber			
tion	Cribbing			l		tals		
					Ore			
	Foremen			Shaft	Mill Di	rt	_	
	Shift Bosses	-!-	H	No. 2	Waste			
	Machine Men		23		Timber			!'-
	Machine Helpers		HOIST			tals		!:-
	Hand Miners Muckers		~		Ore Mill Di			'
			I	Shaft	Waste	rt		<del></del>
	Trammers Timbermen		l	No. 3	Timber			
<b></b>	Timber Helpers			1		tals		
Operating Stopes	Ore Sorters and Loaders					Waste		,
	Trammers—Ore House	- -			Per Ma			
	Nippers			Totals	Total Tons			
	Track and Pipe Men				100011000	10 0010		
	Cagers and Topmen	-			Ore	——;		
	Samplers			Shaft	Waste			
	Scavenger			No. 1	Net Or	e		
<del></del>				1				
	Machine Men		ORE HOUSES	0.4	Ore			
	Machine Helpers	_	요	Shaft No. 2	Waste			
Develop-	Hand Miners	- -	<u> </u>	110. 2	Net Or	е		
ment	Trammers		l X		Ore			
	Timbermen		0	Shaft	Waste			
	Timber Helpers			Мо. 3	Net Or	е	_	
	Marking Cham			1	P DISE	TDCPME	NT.	i
	Machine Shop				RE DISBURSEM		Lot	
	Hoisting Surface Engineers Underground				Loaded	Shipped	Nos.	Assayı
	Compressor Engineers				<u> </u>			<del></del>
	Boiler Room		Shaf	No. 1				
	Pumpmen							
Chess	Blacksmith Shop							
Shops and	Carpenter Shop		Shaf	No. 2				
Surface	Surface Men							
Labor	Watchmen	_						
	Powdermen							
ř	Storekeeper		Shaf	t No. 3				
	Haulage Engineers							
	Totals	— —	- TO	TALS				<b> </b> -
	TOTAL SHIPTS TO DATE			ns to Date	<u> </u>			- <del></del> -
	TOTAL DRIFTS TO DATE		1	THE PART				
			l		<u> </u>			<b> </b>

Fig. 224.—Form 27.

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	0371	102	00	netr	UOTIO	N					OI	PE	LAT	ING	81	rop:	28						
	Office Men.	Burreyers	New Buildings	New Machinery	Orthblings		Pormon	Shift Been	Machine Men	Machine Helman		Hand Wibers	Muskers	Transmers	Theberson	Timber Reipers	Ore Serters and Londors	Transsers in Ore House	Mpers	Track and Pipemen	Ongurs and Topmen	Bemplers	Bearmager
1 2										$ar{1}$	-	-											
31 TOTALS,		Ē	Ē						Ē	Ī	Ŧ	Ī			_				F		Ē	Ŧ	H
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DEVELOPA	EN	1		8	нор	8 A	ND	8UE	RFA	CE	RE	POI	RT		T	OTA	L8						(
Machine Mes Machine Belgers Hand Miners	Chabernea	Clauber Holpers	Mashine Shop	Surface Bolecing	the second	Boller Rosm	Pumpmen	Ulaskemith Shop	Ourpeater Shop	Burface Mon	Watchmen	Powdermen	Berekesper	Hanlage	7	N. A.	TO DATE	8RAI	PI No	-		HOI	••
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Fig. 225.—Form 26.

A summary of the stores used each day is entered on a Daily Store Room Distribution, Fig. 223, form No. 25. In making up this report the charges against the various accounts are grouped and the charges against each account is subdivided to show the various kinds of material used, also the quantity and value. This report is made out by the Store-keeper and turned into the mine office.

The daily report or Store Room Distribution is posted to a Record of Stores Used, Fig. 211, form No. 8 (same as labor distribution), which is the permanent record of material used for the month. On this record the charges are shown under the various accounts benefited.

Physical Report.—A Daily Labor and Production Report, Fig. 224, form No. 27, is made out by the mine clerk each morning and forwarded to the President of the company. This report shows a distribution of the labor for the day, an analysis of the material hoisted, also a distribution of the shipments.

Physical Report. Monthly.—This report is made out each day from the Daily Physical Report. The report is cumulative, giving an accurate statement of the Labor, Production and Shipments.

This report is kept in the Manager's office for ready reference.

Watchman's Report.—The Watchman makes out during his shift a

Date			WATCH 191	iman's 	REPOR' 	Г 			Shi
BOX NO.	1	2	3	4	5	6	7	8	9
P.M. 1									
12								<u></u>	
A.M. 1									
11							<u> </u>		ļ
12			<u> </u>						
						-	<del></del>		<del></del>

Fig. 226.—Form 15.

report, Fig. 226, form No. 15, showing the time that he passed the different boxes on his rounds. This report goes to the Superintendent.

Ore Register.—An ore register is kept at the mine office, showing on the left-hand page the lot number of each shipment, the numbers of the cars in which it was shipped, the gross, tare and net weight of each car. On the right-hand page is shown the mill settlements; the deductions for moisture, the mine and mill control assays and umpire assay, if any; the settlement assay, gross value of the lot, deductions for freight and treatment charges, and net returns to the mine.

Shipping Report.—For each lot of ore shipped there is a Shipping Report made out like the following:

SHIPPED F	ΕT	0						•					
Mine Lot No						of Ore							_
NT CAR	CAR NO.		GRO	) 98			TA	RE			N	ΕT	
						П							
		П	П		T	П							
TOTAL W	EIGHTS	П	П		Т				Γ	П			

Fig. 227.—Form 30.

Stope and (or) Development Sheets.—At the end of each month two reports are made out, one to cover the months operations in all the active stopes of the mine and the other to cover the month's operations in all the active Development openings of the mine. These reports show the active openings listed. The information called for by the headings on the sheets is taken from the Distribution Sheets, form No. 6. The heading on the Stope sheet marked General Expense covers, Pumping Lighting, Assaying Surveying, Repairs, General Expense and Office Expense. The total cost on the Stope sheet equals the Stoping account in the ledger. The total cost on the Development sheet equals the Development account in the ledger. These reports go to the Manager.

General Cost Sheet.—The Cost Sheet, Fig. 229, form No. 40, is made up as soon after the end of the month as possible. This Cost Sheet, which shows all the mine expense accounts, is kept on the co-ordinate

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G. 228.—FORM 19.

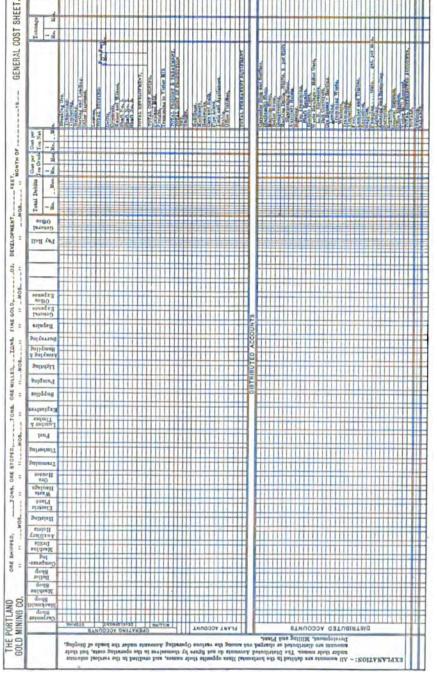


Fig. 229.—Form 40.

system, the debits being shown on the horizontal lines, and the credits in the vertical columns. Thus each item on the Cost Sheet is viewed in two relations, a credit to the heading under which it is, and a debit to the heading opposite on the horizontal line.

The direct charge of labor against the various accounts is shown in the Pay-roll column. In the General Office column is shown a summary of the Voucher Register for the month. Other Expense, which is a sub-account of Stoping covers the following items; Pumping, Lighting, Assaying, Surveying, Repairs, General Expense, and Office Expense.

## CHAPTER VI

#### **ENGINEERING DATA**

## METHODS OF RECORDING USED BY THE CALUMET & ARIZONA MINING CO.

The essential feature of the system is that all work is done under a serial system of numbering of cross-cuts, raises, winzes, stopes, and any class of opening that may occur underground. That is in any given mine we begin with No. 1 for each class of work on each level and

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Fig. 230.

the next number is No. 2 for that class of work, regardless of its position on that level.

Having a description of the way the office records are kept and illustrative forms, it will be an easy matter to understand the necessary form of note book used for various classes of field work.

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Fig. 231.

The forms are printed on 5 in. ×8 in. cards. There are eight standard forms besides the markers. These forms are Survey, Sketch, Elevation, Measurement, Raises and Winzes, Stopes, Total cards for Measurements, and Total cards for Stopes.

The Survey card is shown as Fig. 230, the reverse side of this card is shown as Fig. 231. The markers used with these cards are merely blank cards carrying the word Survey on the segment of a circle raised above the cards so it can be seen as shown in Fig. 232.

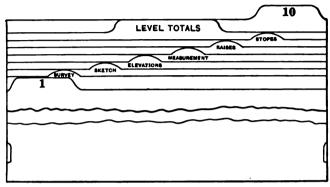


Fig. 232.

Referring to Fig. 230 the card headings give a full description of location as well as reference. The description includes Mine, Level, Initial Point, which is station No. 7 in this particular case, the total latitude and departure of which follow, and "Survey of" the number

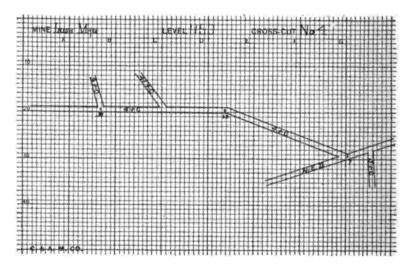


Fig. 233.

of any desired cross-cut. In this case it is No. 4 cross-cut. The reference are "Note Book" and page giving the place where the original field work was done. The column headings are self-explanatory, however.

Under the column heading "Station," the bearing or course of station No. 9 to station No. 7 is copied from an earlier survey card to give a basis for figuring the succeeding courses in No. 4 cross-cut. The way the stations are read is, set up No. 7, bachsight No. 9, foresight No. 29, so it follows that the bearing given is always between the first and last stations on any line and that the latitude and departure is always for the last station, that is the one in the smaller sub-column. Following the survey card and in connection with it, is the Sketch card, shown as Fig. 233, with its markers. This card is cross sectioned 10 spaces to the inch. The scale of the particular sketch is 50' to an inch, but this is arbitrary and any scale can be used in accordance with the length of the cross-cut to be sketched, or for that matter no scale at all is necessary, but just an accurate picture sketch. The back of the card is blank.

Figure 234, is of an Elevation card. The card headings are self-explanatory, except heading "Sketch B. M." which is really station No. 7, but for convenience the rail under station No. 7 is used (refer to Fig. 233). At any time the rail can be checked up from the B. M. Station No. 7. Accordingly in the column heading "Station" we put No. 7 or whichever is the last point referred to. To save space this card is the same on both sides so that a long series of levels can be kept on the same card.

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Fig. 234.

The next card of the series, is shown as Fig. 235, is a measurement card for cross-cuts. This card shows the location of the cross-cut being measured, and where the field notes can be found. The initial point is Station No. 7, the latitude and departure of which are given. As can be seen from the column headed "Date" a measurement is taken four times a month. This is always taken from the last survey station in the cross-cut. For one month the cross-cut was measured from the initial point, Station No. 7, so only the two columns, "Total Length" and "Feet Extended," were used. Then Station No. 29 is put in 137 feet from Station No. 7. This is also the distance from the initial point to the last station so the figures 137 are put in both columns, and

the measurements then are recorded from Station No. 29 in column marked "Last Station to Face," and so on until Station No. 37 is put in 130 feet beyond Station No. 29. Then the distance in columns "Initial Point to Last Station" becomes 137 plus 130=267 ft., etc. It is not

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Fig. 235.

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Fig. 236.

necessary to fill in every line in the columns "Dist. Sta. to Sta. and In. Pt. to Last Sta.," but just those lines at the date of new entries. The heading on the back of this card is the same as the front, at the bottom instead of "Remarks" there is space for the yearly totals.

Figure 236 is a "Raise and Winze" card combined. The card headings give the location, as on the other cards, the latitude and departure in this case, however, locate the center of the raise, and lengthwise it is parallel to the course of No. 2 cross-cut at this point. On the left side of the card is given a sketch of the symbols used for a raise and a winze, also a verticle section of either. Usually this vertical section is filled in solid as the raising or sinking advances, or a mark is put at the point where the work was discontinued. In the illustration it is not marked. This vertical section also shows our standard distance between levels which is 103 ft. This is made up of one sill or Zero set of 9 ft. and 12 other sets, as marked, each 7 ft. 10 in. The columns are self explanatory. The back of this card is blank.

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Fig. 237.

The next card of the series, shown as figure 237, is of Floor No. 6, Stope No. 4. Headings are given on this card stating the raise off of which the stope is made and the cross-cut on which the raise is located. The latitude and departure is off the center of the raise No. 4. The number of the stope is always the same as the number of the raise from which it is worked. If there is a raise which has no stope off of it, a card is put in the proper place under stopes, showing that there is no stoping under that number, in this way all confusion is avoided. The left hand half of the card is cross-sectioned for sketching, also lettered and numbered for the convenience of the stopeman.

Detail of the sketch is shown full size in Fig. 237, a. The right half

of the card gives space for recording the number of sets taken out each month during the years 1902 to 1910. It also shows the colors used for each month and the cross-hatching for each six months. Thus by reference to any stope, we can tell the number of sets stoped in any month of any year and their exact location. There are as many cards to each stope as there are floors. The back of this card is blank.

Figure 238 is our Measurement card. It is unnecessary to fill in any of the headings or columns on this form for illustration, as they are so arranged as to be used for all measurement totals. For example take the card heading "Monthly record of All," this can be followed by "Raises and Winzes," or Sub-Raises and Sub-Winzes or Cross-cuts, or Sub-cross-cuts or Openings, written in the blank space. After "On," the blank may be filled by any particular level number as 1150 or by "All," meaning all levels in that mine. This card is also applicable for one month in any year, or follow the word month with "All" and it becomes a total card for the whole year. Under the first column head-

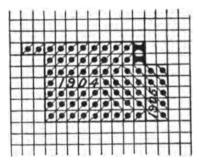


Fig. 237a.

ing "Name of" put whatever the card is being used for in half space, such as "Cross-cut" or "Winze," then below this on the lines, will follow the numbers of the particular openings designated. The entries under any month are totaled at the foot of the card, the total is carried to the reverse side of the card, and from there it can be carried to another card and so on indefinitely. At the end of the year (say 1912) the entries of openings are cross totaled and entered in the column headed "Feet Extended." The sum of the twelve column totals under months will check and equal the total of the column headed "Feet Extended." In the next column headed "Total Length" December 31, 1911, we have the total length of the opening copied over from the previous year. This figure plus the feet extended equals the total length December 31, 1912. As a final check on the figures, the sum of the totals of columns "Feet Extended" and "Total Length" December 31,

1911, is equal to the total of column "Total Length" December 31, 1912. The back of this card is a duplicate of the face.

The "Stopes Total card" shown as Fig. 239, is very elastic in its use similar to the Measurement total card. It can be used for the stope totals of one level in a mine, or all levels, or for one or all months, as the case may demand. The column headings are self-explanatory after the descriptions of the total cards for measurements.

The object of these total cards is so that at any time we can get the work (either stoping or development work) done up to the given time. This is very easily accomplished with this form of card and it can be done by any engineer, whether he posted the work or not. The back

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Fig. 238.

of this card is printed the same as the face, excepting that at the bottom it reads "Continue to Card No. . . . . , instead of continue on other side.

The arrangement of the cards in the boxes is merely a matter of detail. We use groups of ten subjects for each marker, that is, in front of the marker "Survey" there would be the survey of ten cross-cuts serially. The main numerical markers No. 1 and No. 10, Fig. 232, are of yellow cardboard, General markers, such as are used to designate "Level Totals," Fig. 232, are a reddish cardboard. There are other special markers, but it is not necessary to describe them here. In general the records of the mine are kept in one or more drawers marked to that effect on the front. If there are records of more than one mine in a drawer, the records of each are kept separate by sub-markers.

It can be seen from the foregoing what all the forms used for keeping notes of the field work are. Fig. 231 is on the reverse side of the Survey card (Fig. 230), and it has the same columns and headings as the pages of the survey field book. This gives us an exact reproduction of our field notes, so if a field book is lost we have all the notes as taken. For elevation and measurement, the form used in the field is identical with

that used for office record (Figs. 234-5). Of course, in all cases the size of the sheet is changed so as to be more convenient for underground use. In the field we use the same blank for keeping the record of raises and winzes as that used for measurement. This simply necessitates crossing out two or three column headings. The stopes are taken on leaves cross-sectioned on one side similar to the cross-sectioning on the card, and on the other side columned for keeping track of sets stoped per month.

As the working shafts of the Calumet and Arizona are scattered over a wide area and the underground workings are largely interconnected, it is necessary to have large sheets for our detail working composite maps. We use sheets 5 ft. ×12 ft. All the underground workings not stopes, are plotted on these sheets, using a scale of 50 ft. equals an inch. For the areas where there are a great many workings, we use a smaller

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Fig. 239.

sheet and have one for each level. The tracings are made on sheets of tracing cloth 32 in ×48 in. Each one of these covers a certain section and they are numbered Section No. 1, etc. On the margin of each tracing, the number of the section joining it on that side is given and the positions of all the sections are shown on the composite map. There are tracings of the composite maps, and also tracings of each level, showing the stoping done on that level and having the level above dotted on. The stope maps are made up from the cards of tracing cloth in two sizes, 24 in. ×36 in. and 32 in. ×48 in. These maps are so arranged as to be easily found by anyone as they are identified with the various mines and they in turn with the various sections. There are 13 stope maps to each level, that is, the level proper is designated as the sill, or zero floor, and above this there are 12 floors. The stope work is taken and posted on the maps on the first and middle of every month, so that the exact condition of the stopes can be seen at any time. The stope maps are assembled copies of the cards, having the colored dots and cross-hatching showing when and where the work was done. For open stopes without timbers of which there are a few, a horizontal section is taken at elevations equivalent to the heights of sets and plotted on the map in irregular outline.

This outlines the system of keeping engineering records of the underground work.

#### ENGINEERING DATA

METHODS OF RECORDING USED BY THE BOSTON AND MONTANA CON-SOLIDATED COPPER AND SILVER MINING COMPANY

With a large company like the Boston and Montana, it is of the utmost importance that the engineering records should be kept in such shape that any information desired in the process of development and mining can be obtained with the least possible delay. The fact that all of the notes and records taken in the field are correct and self-explanatory does not insure that they can, without additional and special helps, be used to the best advantage in the office.

The system used by this company was not adopted at any one time, but was the outgrowth of needs made manifest during ten years past. One addition has demanded another, while old methods have been discarded for new and better ones.

The field work of the present systems consists of surveying, stope and progressing measuring. For each branch of work a special book is used, all books being made to order. The surveying books, which are 5 1/2 ×8 1/2 in. in size, have the following printed headings above each double page, "Transit" "H. I." "Ang. R." "Courses, Mag. and True" "Vert. Ang. and Slope Dist." "H. P." "Station to Floor" "Horz. Dist." "Description."

Each heading is in a seperate column. In the Transit column are the numbers of the stations at which the transit is set up and numbers of the backsight stations, written like this, "11517 B. S. 8623." "H. I." means height of instrument from the brass tag at the point of observation. In underground stations, written like this, "11517 B. S. 8623." "H. I." means height of instrument from the brass tag at the point of observation. In underground work these tags are usually placed above the opening, upon a car or plug in the roof. In such cases the H. I. would be "to the axis of the telescope." All angles are turned to the right of the backsight and then doubled, both readings being recorded in the column "Ang. R." the first being above the second.

316 degrees 08'

The angles taken at No. 11517 above are recorded 272 degrees 16' Magnetic courses are taken at every set-up and recorded in the column "Courses Mag. and True." The true courses are also recorded in ink in this column after calculation in the office. While magnetic bearings

are not accurate enough for close work, yet if an error of two or more degrees is made at any given point, the several readings of the needle at succeeding points in the survey will indicate about where the error was made. It is for this reason that magnetic bearings are taken.

The heading of the next column is self-explanatory. "H. P." is the vertical distance from the line of sight to the brass tag at the forward station. From this tag the distance is measured to the floor and recorded in the column "Station to Floor." For surveying purposes, the elevations of the brass tags are calculated, while for the use of the manager, superintendent and mine foreman, the elevations of the Floors are determined.

"Horizontal Distance" contains either actual horizontal distance measured or reductions from slope distances.

The last space, "Description" is cross-sectioned sixteen squares to the square inch. It occupies about three-fourths of one single page and is used for the description of the survey stations, side points, and for sketches of mine openings, etc.

The surveys are made and recorded in such a manner that all openings with the square sets therein, also all surface improvements and natural objects, contours, etc., can be accurately platted. The notes of all surveys are recorded in chronological order from the beginning to the end of each book. This brings all survey stations numbers in order through the books, but in continuing the work from month to month, any place surveyed more than once will appear only in its regular monthly order. An index of all such places is kept in the front of each book.

The field notes having been taken and recorded in the manner described, are now reduced in the office. The surveyor and his assistant have calculation books paged alike, and upon pages numbered the same, make like reductions, both working together and making comparison as the work progresses. The observed angles are reduced to azimuths, and the bearings determined therefrom by inspection. Horizontal and slope distances are calculated from the vertical angles and slope distances. The coordinates and elevations of all the survey stations are calculated. The zero point of the coordinate system was established in such a manner that almost all the stations located are north and east of that point. The elevations are given in feet above sea level. In these calculations "Gurden Traverse Tables" and "Vega Logarithmic Tables" are used.

As soon as the calculations are made, the number of the page in the calculation book where the work is done, is marked in ink in the field book, so that every figure used in the calculations can be found at any time by reference to the field book, and then to the page in the calculation book.

In order to preserve the notes in case of loss or damage of a field book, complete office records of all the essential features of the field notes are kept. These records are in ledgers 11 in. ×14 in. In addition to the headings given in the field books the ledgers have the following; "Azimuth," "Vertical Distance," "Latitude N. S.," "Departure E. W.," "Ordinate N. S. E. W." "Elevation," "Floor Elevation," "Page in the Field book." In these columns are recorded the office deductions. The sketches made in the field books as are not copied in the ledgers, but are platted with the regular monthly surveys, and thus preserved. The ledgers have an index of all places surveyed, exactly like the index in the field books.

All station numbers are indexed in books made for that purpose, the headings for which are "Station," "Page in ledger," "Page in field book," "mine." No duplicate survey numbers are used in any of the company work. All corners of mining claims owned by the company have been located and indexed. The index book contains the name of the claim, the lot and survey number, the location and description of each corner with the markings thereon the coordinated, page in the ledger where the survey is recorded, bearings and distances from corner to corner as determined by calculations from the coordinates, and page in the calculation books where the calculations were made. All of this data is recorded in columns which have printed headings descriptive thereof.

For a better preservation of all underground work, several years ago. a complete set of office stope books were made. These books are 18 in. The pages are ruled with coordinate lines in the process of manufacturing as it was found that the ruling could be done by the printing office much more accurately than by hand, and at far less cost, Each double page contains 176 squares, 2 in. each way, or, with the scale used in platting, 50 ft. to the inch, each double page covers a territory of 800 ft. by 2200 ft. There are at the present time six sets of these books covering all the principal mining operations of the company, and if placed together in proper relation, would include ground described as follows: north 3200 ft., east 2200 ft., north 800 ft. east 2200 ft., South 1600 ft., west 2200 ft., south 2400 ft., and west 2200 ft. Each of these books contains 130 double pages, numbered alike. The first book in each set includes workings from the surface to and including the ninth level, the second book includes from the floor of the ninth, to and including the eighteenth level. The third book will include not over five levels. It has been found that nine levels are too many for one book.

The books are constantly in use, and the wear on them is too great for more than five levels. Underground workings of the company, outside of those included in the books, are platted upon sheets of mounted drawing paper 18 in. ×24 in., being the same size as one page of a stope book. These sheets are adjusted to the pages of the stope books, so as to form a continuation of the system used in the books. The coordinate numbers are hand printed at the top and side of each double page of all the books, and also on the mounted sheets. The books include the levels, with all the stope floors above the levels, so that when platted they contain a representation of all openings, with the square sets, at every interval of about 7.5 ft. in elevation throughout the mines, all being properly adjusted to the coordinates, and hence to each other.

The platting of the surveys is in order after the office work in connection with the field notes has been completed. This is done by scaling from the nearest coordinate lines north and east to the points for these survey stations, using the coordinates of the stations for the distances.

The platting is checked by scaling the distances from succeeding points. The square sets are then platted in proper relation to the survey, and the boundaries of the openings drawn as given from the special notes or sketches in the field books. Every square set is represented as it exists in the mine. This comprises the platting of the surveys in the books.

In order to preserve the books from unnecessary wear, the workings of each level in each mine are transferred to mounted sheets 28 in. × 48 in., this size being sufficiently large to include all the workings of any mine. The station numbers are platted on these sheets from the calculated coordinates. From the mounted maps all tracings of levels and reductions to other scales are made.

For various uses, all levels are reduced by pantograph from the 50 ft. scale to 100 ft. scale, and from that to 200 ft. scale. All the reduced maps are upon mounted sheets of drawing paper, 18 in.  $\times$  24 in., and are so related to the coordinate system that additional sheets can be added in any direction.

None of the maps described in this article are composite, each sheet representing one level only. Each level, except in the stope books, has a special color for that particular elevation. Water colors are used on mounted paper, and "no rinkle" or colored pencils on tracings. Colored pencils used on the dull side with india ink lines on the glazed side make the best maps. The colors are toned down with felt or chamois stumps. All the workings in the office stope books, including stopes, have a color for each year, the work being brought up at the beginning of the calendar year. All mine numbers are hand printed on all level maps, as well as in the stope books.

The surface survey is platted 50 ft. to the inch, upon mounted sheets covering all the property owned by the company. They are arranged

in numerical order, and show all streams, roads, ditches, shafts, tunnels, open cuts, buildings, railroads, and all claim lines, with shading around the boundary of the company property.

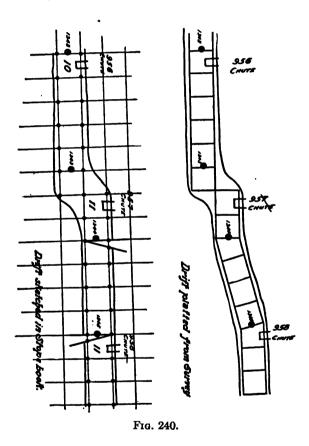
For general use, all the features on these sheets have been reduced to 100 ft. scales, upon mounted sheets of the same size as the 50 ft. scale maps. All of the surface sheets will be corrected from time to time as changes are made, and new sheets substituted for old ones. There is an index sheet for the surface maps of the same size. It shows all claims owned by the company drawn to scale of 800 ft. to the inch, and is cross-sectioned so as to represent the spaces occupied by the different surface sheets. Numbers from 1 to 240 are placed in the rectangular spaces, and the corresponding numbers, as used are printed upon the bottom of the surface sheets. Knowing the locality desired for examination, the index gives the sheet sought. By using one, four, or sixteen squares on the index sheets it is an index for 50 ft., 100 ft., and 200 ft. scale maps.

The stopes are measured or "taken up" as it is called, once a month, or oftener if it becomes necessary. For this work leather bound books 5.3/8 in.  $\times 11.1/2$  in. in size are used. The pages are cross-sectioned, giving 16, 36, 64, or 100 squares to the inch. The boundaries of the square inches are heavier than all the other lines. The small veins are sketched in the books having the large squares, and the large veins in those having the small squares. Usually before going underground, the portion of the level where the stopes are to be located is sketched from the office stope books into the field book, the location of all chutes and survey stations being indicated, as in office books. In the field books, however, the drifts are made to follow the cross-section lines by indicating the bends by  $\vee$  or  $\wedge$ , as the drift bends either to right or left. The difference between the surveyed drift and the same drift sketched, will appear from Fig. 240.

The veins owned by the company run in an easterly and westerly direction, with usually a south dip. There are a few veins that dip to the north. The books represent the veins as viewed from the south.

In stoping up from a level on a south dipping vein the different floors will show offsets to the north. It is customary to give the number 10 to the first row of sets along the level on such a vein, using 11, 12, etc., for the offsets, either on the level or in the stopes. These numbers are carried in the chute sets, which are the reference sets for all of the floors of the stopes. On the level, the discharges of the chutes are sketched on the north side of the drift as they appear in the mine. On the first floor of the stope the chutes will then fall in 11, 12, etc. The posts standing on the level and in the stopes are represented by dots at the intersections of the printed lines in the books, while the chutes in the stopes are represented by squares which have their angles at the posts of

the chute sets. The stopes are sketched by counting the sets, indicating the posts and chutes as described, and by drawing the outlines around the openings. All bends or angles found in the stopes are located and sketched. Often measurements of irregular caps and girts are made, and sometimes it becomes necessary to carry a transit line into the stope. Within the sketches of the openings are recorded the dates upon which the stopes were "taken up." Usually but one floor is sketched on a page. When the veins dip north the row of sets on the level is numbered 10, and



chutes show on the south side of the drift, the offsets in the stopes are numbered 9, 8, etc. After having been platted in the office, all notes in the field books are inked with indelible ink. The platting of the stopes in their proper position, relative to the coordinates in the office stope books, consists of carrying the lines of the square sets platted on the levels, up through the books by scaling, and testing with tracing paper, and then reproducing the sketches in the field books along those lines.

As a rule, all bends in the stopes conform to the bends on the levels, if not, they are platted as actually located in taking up the stopes. In the office books the chutes on all stope floors are colored black, and the numbers of the chutes are written adjoining. The lowest levels in all stope books are at the back of the books, and first floors of the levels next, and so on toward the front of the book for every level and stope above.

From what has been stated in regard to the construction of the office stope books, it can be readily understood that in case of a sudden demand for tracings of any or all workings, but a few days would be required in which to comply with the demand. This actually occurred less than two years since. A fire broke out in one of the mines and in order

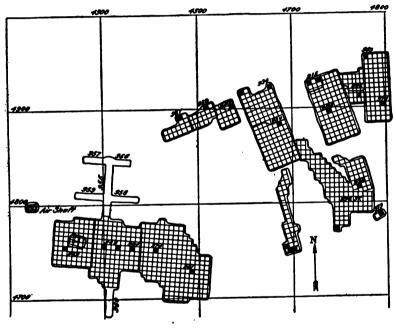


Fig. 241.

to stamp it out a large amount of extra mining was done. To do this and avoid breaking into old workings unexpectedly, it was necessary to make tracings, not only of several levels but of the stopes above the levels. With all the work correctly platted in the books, the tracings were ready for use within three days, whereas had the stopes not been platted as described, it would have required not less than a month and probably much longer. Then again, in the regular mining work it is often necessary to have special tracings, which will show any section of unworked ground, or the exact location of all stopes, or filling, cross-cuts, etc. The infor-

mation is always ready in the books for instant use, either by direct examination, or by tracings.

A clear idea of the entire stope-record system can be gained by an examination of the accompanying copy of a portion of a floor of one of the mines shown by Fig. 241.

In order to understand the progress measuring, a statement of the system of numbering used in the mines is necessary. All places such as cross-cuts, drifts, rises, winzes, chutes, and stopes are numbered in such a manner as at once to indicate the level on which they occur. For example all numbers on the first level are 100 to 199, A100 to A199, etc., all on the second level are 200 to 299, etc. So that all numbers for any level come within the hundred used in designating that level. On the 11th, and 21st, of each month all places run for development are measured, while upon the first of the month all openings including stopes are measured.

For the purpose of recording the progress of all shafts, cross-cuts, drifts raises, winzes, and stations, progress books are used which have these headings: Date, Vein, Place, Charge, Advance, Total, From, Height or Length, Width, Cubic Feet Ore, Cubic Feet Waste, Cars Ore, Cars Waste. The total distance mined in any particular place is recorded when measured in the column Total. The preceding measurement of that place is then substracted from the total, and the remainder is recorded in the Advance column. Under the head Vein is written the name or number of the vein upon which any working is located, under place, is the number of the working, while under Charge, are the initials of the words showing for what purpose the work is being done. mining, D is for development, F is for filling, S S is for shaft sinking. An account of the cost of mining all numbered places is kept by the clerical department of the company, and it is for that department the above letters are used. The purpose for which the work is run is determined by the foreman or superintendent. Under From is written the number of the opening from which any opening is measured. The other headings explain themselves. The cars of ore and waste are obtained from car-tally boss at the mines.

The record made in the field having been completed by calculations in the office determining the advance and cubic feet excavated, a report on progress sheets, 12 in. ×17 in., is made out. The sheets for the monthly reports contain all the headings of the field books except, "Height or Length," Width, Cubic Feet, Total, and in addition have columns marked "Distance in Ore," "Width in Ore," "per cent. Copper," "Oz. Silver," Distance in Waste, Square Sets, Remarks.

During the progress of work in the mines a mine sampler takes samples of all veins. These samples are taken horizontally across the vein, at right angles to it, and at regular intervals of from 5 to 10 ft. long. After these samples have been assayed, copies of the assayers reports are filed in the engineer's office. From these reports, all except stope assays are copied in assay books during the month. At the end of the month the recorded assays of any particular place are averaged, so that the progress in ore and waste, the width of the ore and the assay values are determined. These data are recorded on the sheets showing the monthly progress in the columns for that purpose. After these sheets have been carefully checked in every particular, they are used by the clerical department in making estimates of the cost of mining. They are then copied into bound progress books the same size as the sheets, there being a progress book for each mine. These books are constantly used for reference. The annual report of progress is made from these books, and contains a summary of everything therein recorded except assay value. These reports are copied in the annual progress books.

In order to preserve the knowledge of the exact location of all mine numbers, of which there are several thousand, and also as a partial index of the progress reports, the numbers are indexed in a set of books for that purpose. These books are 9 in. $\times$ 11 in., one being used for each mine. Above the ruled columns are the printed headings, Number, Description, When Commenced, Place of Beginning, Ordinate N, Ordinate E, Remarks. The ordinates are scaled from the office stope books, and with other data, afford an accurate method of finding any number. These index books are brought up to date with the regular monthly work, all new numbers given out at the mine being located and recorded.

Of the office work thus far described, the most important, making reductions from the survey notes, copying field notes and office calculations, platting stopes, and copying monthly reports, is done by one person and checked by another. By this means all material errors are eliminated.

At the beginning of each year complete calculations of the ore reserves are made. Some of these calculations are made by applying the mine assays directly to particular portions of the veins as shown in the stope books, while a much larger number are made from maps showing longitudinal projections of the veins. The maps are 18 in. ×24 in. and show the workings drawn to scale of 100 ft. to the inch.

The first map of any vein shows all workings on the vein from the surface to the sill of the twelfth level, while the second map will include all workings from the sill of the twelfth level to that of the twenty-sixth, level. These maps are cross-sectioned with lines 1 in. apart. The vertical lines are marked with the same numbers as the north and south coordinate lines in the books (stope), which include the veins projected. The horizontal lines are elevation lines and represent even hundreds of

feet above sea level. The planes of projection, except one which is north and south, are due east and west. All mine openings are projected by scaling east or west (except for north or south plane for which the scaling is north and south), from the nearest coordinates in the stope books to the ends of such openings, and then platting the distances thus obtained, on the projection sheets. The sill is first platted in this manner, using the calculated elevations to determine the vertical position on the sheet. Above the sill and parallel to it, are drawn pencil lines to represent the height of the stope floors, and the openings are then platted as stated. All new openings upon the vein are platted at the beginning of the year. The workings shown upon the projections are shaded with the same colors as the corresponding years in the stope books.

The veins are divided into convenient blocks, usually extending from one level to another, the blocks being bounded laterally by dotted The tons of ore in each block are obtained by scaling the height and length of the block from the map, multiplying the product of these two by the north and south width of the vein, and dividing the result by the estimated number of cubic feet of ore to the ton. The north and south width of the vein is obtained by calculation, from the average width of the vein given in the assay reports, and the course of the vein within the block. If the average width of the vein is found to be 10 ft. and its course is N. 35 degrees W., the width north and south will be 10 ft. divided by sine 35 degrees equals 17.4 ft. The course of the vein in the block is obtained by protractor from the drifts in the stope books, the general course of the vein being used. The contents in copper and silver in the blocks are obtained from the average mine assays of the drifts and raises inclosing the blocks. The extractions made during the year from any particular block are deducted from the total in the block by scaling from the projection maps, and making therefrom the necessary calculations of tons of ore, pounds of copper, and Oz, of silver,

Besides the annual determinations of the ore reserves, an estimate is made of the excess mined in the veins above the amount formerly calculated also a comparison between the cubic feet extracted from each mine and the total number of tons shipped, in order to determine the number of cubic feet of ore per ton in the mine.

Monthly and yearly records are kept in the department of the ore shipped from each mine, the per cent. copper, and ounces of silver and gold per ton, also the resulting pounds of copper, and ounces of gold and silver. The assay values of the ore are obtained from the sample cars which are regularly shipped to the smelter at Great Falls. These records are kept in books made to order for the purpose.

The above descriptions include the salient features of the methods of keeping engineering records used by this company. There are a

number of details which have necessarily arisen in connection with the elaboration of the work, which need not be mentioned.

All permanent records are kept in the most concise form possible, and are especially adapted to the work of a large company.

### GEOLOGICAL DATA

# METHODS OF RECORDING USED BY THE CALUMET AND ARIZONA MINING Co.

At the present time the output of the mines of the Calumet and Arizona

Legend

company is about 1600 tons per day. A little over 50,000 ft. of development work is done each year. In order that a good geo- Schist logical record be kept of all these openings the company employs in their geological quality department three inspectors, whose duty it is to visit each of the openings often enough to make note of and have sampled the formations exposed before the openings are lagged or filled.

The chief engineer of the company has charge of the geological department. Those in this department do no surveying and no mapping beyond tracing maps made by the mine surveyors.

The mine notes are taken in ordinary transit and cross-section books, the former books being used for the development work and the cross-section books for the stopes. In the office these notes are transferred to cards and maps which are indexed and filed away.

The legend used is shown in Fig. 242. It will be seen from this that we have different symbols for, Schist, Quartzite, Limestone, Conglomerate, Rhyolite, Granite, Iron pyrite, Copper Oxide ore, Copper Sulphide ore, Leached material, Broken lime, and various kinds of altered lime. Copper Oxide ore is all material carrying 4 per cent. or more copper and less than 10 per cent. sulphur. Copper Sulphide ore is all material carrying 4 per cent. or more copper and 10 per cent. or more sulphur.

Quartzile	VIII Vellow
Lime	Blue
Conglomerale	1967 Vermition
Rhyolile	XXXX XXXX Green
Granite	V V V Yellow
Pyrite (632)	Bleck
Oxide Ore	Crimson
Sulphide Ore	Crimson
Leached	Brown
Broken Lime	Blue
Allered Lime	YYYY Bhe
Kaolinized Lim	a dive
Leoched Lime	Blue And Brown
Pyritic Lime	Blue And Black
Siliceous Lime	Blue And Yellow
Lime Boulders	, Open Blue

Fig. 242.

1

VIII Yallam

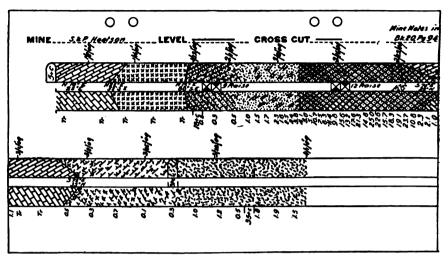


Fig. 243.

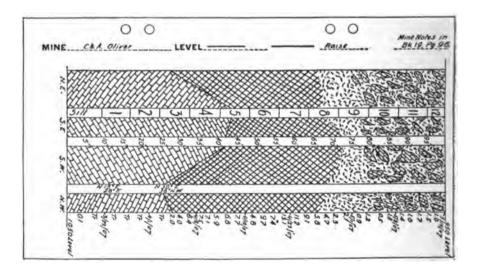


Fig. 244.

By combining the symbols we get all the gradations. For instance pyritic limestone is shown by combining the symbol of iron pyrite with the one of limestone and leached material. The legend shows all the rocks found in these mines. In the mine notes the symbols are shown in lead pencil, but in the office notes, colored inks are used to bring out the distinctions.

Field Notes.—In taking notes on the formation in the drifts, crosscuts, and stations, the actual formation in the left wall and floor are

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			arhyol			- 12	77	77	77	72/7	77	1		Χ.	1	1	l×.	A	177	15	1
C.			-dips	11.		- 1	Н	-	4	+	1-	Н	-	+	-	-	Н	-	-	+	+
77.	0.5hm	a Litt	te me	erali	gation	180	1	-	-		100	78	OR B	200	0.8	1	k×	XX	200	200	+
71.0	lower	lift co	E def	your	- line	3		$\epsilon$	4	A	1	1	33	æ	88	88	₩	×	3	Ø	34
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Fig. 245.

shown. The scale for the height or width of opening is not exact, but except for this the notes are drawn to scale as shown in Fig. 245.

On the left page of the transit book descriptive notes are written. The character of the material cut, contacts, faults, etc., are given; also the distance to the survey station used in measuring to contacts, etc. Anything else that will tend to make the record clear and complete is written down. The formation on the left wall and floor are shown diagrammatically on the right page.

In a similar manner the notes for raises, winzes, and shafts are taken,

the only difference being that instead of having but two walls shown, all four are sketched as shown in Fig. 246. These sketches are drawn to scale except for the width and length which are only approximate. The timber sets are shown on the sketch. The height of the sill set is 8 ft. 10 in. and the height of the other sets, 7 ft. 10 in. center to center.

As for the stope sketches, since nearly all the ground is mined by the square set system, the field notes show the sets taken out and the formation on each floor as shown in Fig. 247.

Calumita Arizana M. Co.		Level	96
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Fig. 246.

Each floor is plotted on a separate page. It is seldom that any other method of stoping is used, but when one is, points are established by the mine surveyors and these are used by the inspectors to make horizontal sections through the stope, at the intervals where the floors would come, were the square set method used.

Office Records.—In the office the mine notes are transferred to cards which are  $5 \text{ in.} \times 9 \text{ in.}$  and are cross-sectioned to inches and tenths of inches. The drifts, cross-cuts, stations, and stopes are plotted to a scale of 1 in. equals 25 ft. The shafts, raises, winzes are plotted to a

scale of 1 in. equals 12.5 ft. As in the mine notes the height and width of drifts, cross-cuts, and stations and the length and width of raises, winzes, and shafts are not plotted exactly to scale. The finished card

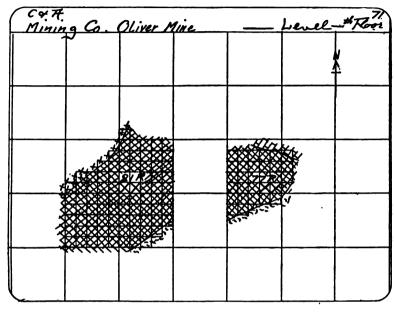
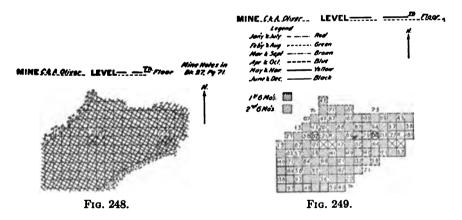
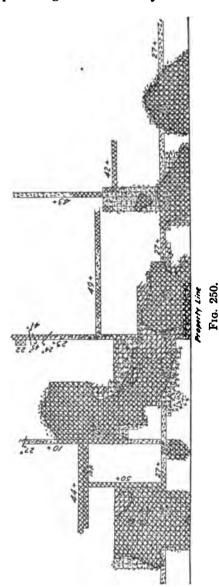


Fig. 247.



notes made from the mine notes, Figs. 245 and 246, are shown in Figs. 243 and 244 respectively. Except for the descriptive notes these cards show everything the field notes show. In addition to this, the cards

for the development work show by the dates the position of the breast, back, or bottom, as the case may be, on the 1st, 8th, 15th, and 22nd, of each month, provided that the opening has advanced during the preceding interval. They also show the field book and page from which



the card was made, all development work started from it, and also in red ink the assays for copper contained.

As for the office record of the stopes, see Figs. 248 and 249. Fig. 248 shows the sets removed and the formation. As there is not sufficient space on this card to show clearly the copper contents and the time of removal, a piece of tracing cloth is cut to fit over the stope card. On this the sets are drawn in colored inks and the percentage of copper is written in black ink at the places where the samples were taken, as shown in Fig. 249. The colored inks with cross-sectioning show the month of the year that the ground was stoped. The year of removal is shown in black ink with a circle around it.

Formation Maps.—In order that the formation in each opening be shown in its relation to other openings, large maps, 53 in.×32 in. are drawn on tracing cloth to a scale of 1 in. equals 50 ft. There is a map made for each floor in the mine. On this, the formation is plotted from the cards as seen in Fig. 250, showing a portion of such a map.

These maps are made on tracing cloth so that they may be traced from the maps of the mine

surveyors, and also that they may be placed on top of each other so that the relations of the formation on the different elevations can be

readily seen. Vertical cross-sections are made on tracing cloth wherever there is sufficient data to make them of use, these are made from the large 50 ft. to the 1 in. formation maps.

Estimates of ore reserves are made about once each year, for which the formation maps, together with the vertical sections are used.

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